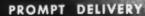
NACHINE TOOL

MARCH 1943



Swiveling ram head and tool holder, automatic circular table and independent automatic feeds in all directions.

to 10" Stroke



150 BROADWAY

DOUGLAS MACHINERY CO. NEW YORK, N. Y.

versammy and Speed Characterize these two MARVEL SAWS



ARMSTRONG-BLUM MFG. COMPANY le Ave. "The Hack Saw People" Eastern Sales: 225 Lafayette St., New York 5700 Bloomingdale Ave.

Chicago, U. S. A.



Replaceable Spindle Belts



Long Tuper Key-Drive Nose



Convenient Drive Cantrol

SPECIFICATIONS

Bettag over bed, die.

Ditatines between neuerin. 15.7

Collei capacity, acas, die. 56.7

Euge chach capacity, mar, die. 57.7

Jow Cheel capacity, mar, die. 57.5

Spinole tripurity, mar, die. 57.5

Spinole tripurity, mar, die. 57.6

Elide rest, travel of grane sitele. 57.7

Fallerock apandie tagnel. 57.7



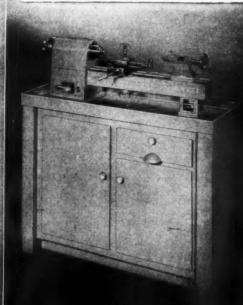
For Further Description

RIVETT

715 PLAIN BENCH LATHE

Power and Speed Range Are Combined with Precision for Greater Earning Capacity

The Rivett No. 715 Bench Lathe fulfills two distinctions: the production of small duplicate parts resulting extreme accuracy, and the finishing and fitting of fine element assembly, maintenance, tool room and latitudes assembly, maintenance tool room and latitudes assembly, maintenance tool room and latitudes assembly, maintenance tool room and latitudes as a fix of the probability of the p



RIVETT

BRIGHTON, BOSTON, MASS.



HARDINGE

HARDINGE BB2V PRECISION MILLING MACHINE

Table: 12" x 3-3/16"
Eight Speeds: 300 to
S000 R. P.M.
Vertical Head has
1/2" Collet Capacity

HARDINGE HIGH SPEED PRECISION MILLING MACHINES

CORRECT SIZE: Closer proportion in the size of a machine tool to the size of the work means greater economy in the original investment and in the cost of the parts produced.

These HARDINGE Precision Milling Machines are small, compact machines designed to do a volume job on small parts, thus releasing large equipment that is too cumbersome for small work in production, tool-room or development departments.



HARDINGE BB4 PRECISION MILLING MACHINE

Table 12" x 3-3/16"
Eight Spindle Speeds:
180 to 3000 R.P.M.
Cutter and Index Heads
have 3/4" Collet Capacity

and the second

ARMSTRONG

The Aviation Industry has been built on modern steels, modern standards and MODERN TOOLS



A creation of modern times and forward-looking men, the Aviation Industry has probably the finest equipped shops and tool rooms in the world. It is significant that throughout "Aviation", ARMSTRONG TOOL HOLDERS are standard equipment. In the Armstrong System Aviation has found dependable, efficient tools for every operation on lathes, planers, slotters and shapers—modern ARMSTRONG TOOL HOLDERS that "Saves All Forging, 70% Grinding and 90% High Speed Steel"; that easily handle modern tough alloy steels at modern cutting speeds; that are always ready for work without expensive delays for tooling up.

With today's tremendous demands, close scheduling, where even minutes are expensive, requires dependable tools of absolutely certain performance—and Aviation has found the answer in ARMSTRONG TOOL HOLDERS.

ARMSTRONG BROS. TOOL CO., "The Tool Holder People"

308 N. FRANCISCO AVE., CHICAGO, U. S. A.
Eastern Warehouse & Sales: 199 Lafayette St., New York

Machine Lool Blue Book

Hitchcock Publishing Co., 542 So. Dearborn St., Chicago

Published Monthly

Volume 39, No. 3

MARCH 1943

Featured in This Issue	101
Editor's Page	103
Extending Tool Life	105
Solving Some Tough Problems By Lloyd Stouffer	121
The Foremanship Forum	133
The "Paper Doll" Technique	157
The "Split-Shift" Plan By Walter C. Mason	169
Rubber Stamps Save Drafting Time	183
Lead Base Bearing Tests	199
Standard Turret Lathe Tooling	203
Tapping Holes Economically By H. F. Williams	213
Tools and Dies to Gun Mount Production By Lloyd Stouffer	221
The Milwaukee Exhibition	227
"Let's Talk Shop"	233
New Tools and Equipment	
Mechanics Through the Ages	380
Index to Advertisers	384-388





R. C. Van Kampen, President J. E. Hitchcock, Vice President M. L. Yonts, Secretary & Prod. Mgr. Wesley G. Paulson, Editor G. E. Elzinga, Circulation Mgr. Representatives

Representatives

Representatives

A. E. Wailes, 55 W. 42nd St., N. Y. C., Phone: Lackawanna 4-4528

D. B. Trott, 2187 Olive Ave., Lakewood, Ohio, Phone: Boulevard 8844

R. H. Deibler, 1709 West Eighth Street, Los Angeles, Cal., Phone: FEderal 8414

Richard J. Ferncase, 542 S. Dearborn St., Chicago, Ill., Phone; HARrison 6040

(Copyright 1943, by Hitchcock Publishing Co., Chicago, Ill.)

Phone: HARrison 6040

Cable Address: HITCHPUB



BILL-you and thousands of other boys are doing a swell job building scale models of fighting planes. Keep it up! American airmen need those models to sharpen their shooting eyes.

But, Bill, in your earnest desire to help now, don't ever forget your dreams of the future and of the better plane you hope to design. Keep thinking, keep planning and, above all, keep learning. Your day is coming sooner than you expect.

And so that you may have that opportunity in a world at peace, Bill, we at Sebastian Lathe are working 'round the clock. Already we have increased our production 800%. But we're still not satisfied. We don't want your plane to be a fighting plane.



SEBASTIAN LATHES

Manufactured by Stokes Industries, Inc.

P. O. Box 1017F, Cincinnati, Ohio, U.S.A.



This w the face that launched a thousand was so beautiful, so serene . . . America mfortable! and so da

the bustles and the corsets and the voluminous billows of tent cloth. Daily her life was besieged with the drudgery and the discomforts of the Gilded Age: The flat iron, the wood stove, the wash tub and the carpet beater, gaslight and the coal grate, horsecars and hansom cabs. But all these things have changed . . . miraculously and wonderfully changed.

And that's the theme of this story: Change!

For today the world is changing faster than ever before, and the first 5 years after this war will be. equal to any 25 years of the past. Because this is true, we at Jones & Lamson have an important story to tell.

We were already 50 years old when Helen of

Troy was a girl. We began with the birth of the Machine Age in America, and even in the very birthplace. Many of the precision machine tools designed and developed by Jones & Lamson engineers during more than a century of the company's history have literally made possible much of America's industrial change.

Because of this background and reputation, Jones & Lamson engineers have actually been called upon by manufacturers - from the largest to the smallest - many thousands of times for counsel, service, or precision machine tools during a single year of this war!

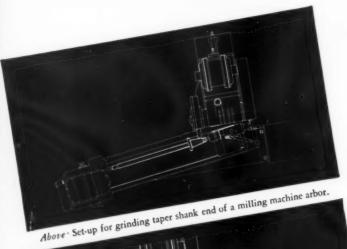
If your business is manufacturing with metal . . . if you have problems today . . . and if you are looking ahead to the swiftly changing markets, products and methods of manufacturing after the war . . . Jones & Lamson engineers and service men can help you. They are at your call!



Universal Turret Lathes . Fay Automatic Lathes . Automatic Thread Grinders . Optical Comparators . Automatic Opening Die Heads

IES & LAMSON MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.
Profit-producing Machine Tools

WIDE VARIETY



Above: Conventional cylindrical grinding set-up, followed by grinding the shoulder, on a CINCINNATI Hydraulic Universal.



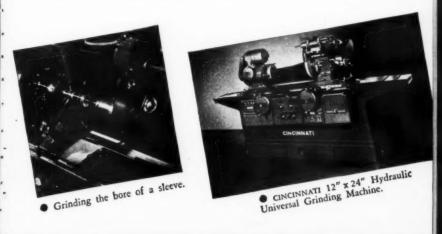
OF PRECISION WORK Quickly Set Up and Finished

on CINCINNATI Hydraulic Universal Grinders

• Of the many factors to consider in the selection of a universal grinder, these two should receive first consideration: (1) how large a variety of work will the machine handle, (2) how fast can the work be accurately finished, including set-up time. An indication of the way in which CINCINNATI Hydraulic Universal Grinding Machines fulfill these requirements has been presented in the small illustrations on these two pages.

First of all, the CINCINNATI machine readily handles three basic types of precision tool-room grinding; cylindrical, internal, and rotary surface. Of course, many variations of these three classifications of work, such as steep tapers, may also be ground on the CINCINNATI. The second factor, set-up time, is exceptionally low for all types of work. For example, the internal grinding attachment may be set to grinding position by merely swinging it down and tightening one bolt.

All these features and many more are presented in catalogs which may be obtained on request: No. G-486 for the 12" machine and G-474-1 for the 14", 16", and 18" machines.





Faster Inspection

WITH

SUNDSTRAND

BALANCING AND CHECKING TOOLS

ve valuable man-hours on inspection, balance, and straightening operations with these indistrand Tools. Extensively used in toolrooms, oduction and inspection departments, shops of y size, and airports to check work, avoid costly tors, and improve shop efficiency.

NCH CENTERS—Sundstrand Bench Cens provide a faster, more accurate means for ecise checking of work between centers. These id, compact, portable bench centers can be ced on a bench or stand convenient to the rk. Available in 7 sizes ranging from 6" x 18" 12" x 60".

LANCING TOOLS—These sensitive, duple Sundstrand Balancing Tools speed up lancing and truing of gears, shafts, pulleys, and nilar parts. Available in 8 sizes and types, aging from the small Supersensitive Bench type the No. 5 Heavy-Duty 12-ton ca-

city. All portable except No. 5.



FREE: Write today for free copy of Bulletin SBT-436 fully describing these timemaving, economical Sundstrand Tools.





Bench Center



Balancing Tools

SUNDSTRAND MACHINE TOOL CO.

to prove parts right or wrong . . . quickly

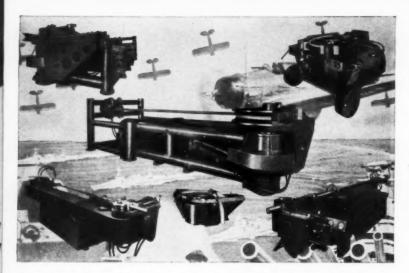


TE IS using a master disk to set his gage . . . a matter of only HE IS using a master than to set the Base to check parts precisely to "tenths." Pieces will flow through inspection rapidly. with a minimum of eyestrain or fatigue . . . with no "operator variation," no element of human error. Frequently women do it

For this is a P&W Electrolimit Gage — one of many Pratt & Whitney products that provide basic accuracy for mass production. better than men. By mechanical-electrical magnification, this type of P&W gage may enlarge an error as much as 20,000 times. In various forms, it checks internally or externally, one dimension or several simultaneously. In one of its forms, it grades parts in increments of .0005" for selective assembly. It is unusually versatile . . . will

If you need basic accuracy for mass production, call on Pratt & serve its owner well in war or peace. Whitney. There is no better paying investment than the right tools for each job. Details of P&W Electrolimit Gages will be supplied on request.

Division Niles-Bement-Pond Company WEST HARTFORD . CONNECTICU



Wallace Modern Full-Automatic, Hydraulic Bending Machines are helping to maintain record-breaking schedules for the shipbuilding and aircraft programs.

Wallace Benders are ideally suited for aircraft parts, marine work and general production of tubular, extruded and rolled sections.

The Wallace No. 500 Series Rotary Type Machine is the only model with full-automatic two-lever control. Any bend up to 180 degrees may be selected by an automatic pre-selector. Exact duplication assured. Hydraulic clamp prevents slippage and hydraulic operation with full automatic control definitely provides precision setting of the mandrel, for each bend.

Full automatic, hydraulic ram type benders are

also available for work when a number of pieces of any given radius is limited. A single lever controls the forward and reverse movement of the ram cylinder.

Wallace Rotary and Ram Type Hydraulic Benders are available in a large variety of sizes for COLD bending up to 16° pipe size, or the equivalent in tubing or structual shapes.

Complete details upon request.

WALLACE SUPPLIES MFG. CO.

BENDING SPECIALISTS SINCE 1900
1314 DIVERSEY PARKWAY, CHICAGO, ILL.



TOOL ECONOMY IS THE WATCHWORD

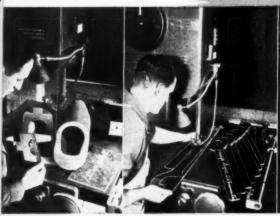
Salvaging tools by sending them back to the manufacturer for regrinding saves labor and materials - - and thus saves tools. We are at your service.



THE CHARLES L. JARVIS CO., MIDDLETOWN, CONN.

TAPPING ATTACHMENTS . FLEXIBLE SHAFT MACHINES . GROUND ROTARY FILES

SPEED THE JOB





DROP FORGED SHELL

Sent by a Birmingham, Ala. firm. Our recommendation: Use an A temper, 8 pitch, 1* saw, .057 Raker set. Speed 75 to 85 f. p. m. to cut 1.09 square faches per minute.

STEEL SPANNER WRENCHES

Sent by a Toledo, Ohio, firm. Recommended an A temper, 14 pitch, ½4" saw, .042 Raker set, run at 200 f.p.m. to cut 1 piece in 21.7 minutes.

14 ST DURALUMIN

Sent by an Airplane manufacturer. Recommended an Atemper, 6 pitch, ½" saw, .042 Raher set, run at 400 f.p.m. to an average 7.59 square inches per minute.

Quality Tools Made By DoAll Associate Companies



THE BIG 5—Do All Contour Machines for rapid internal or external sawing and filing. Priced from \$1,000 to \$5,000, each model with motor.

Do All Gage Blocks

81 to each set. Made in three accuracies:



Working Set, 8 millionths of an inch, \$295.00 Inspection Set, 4 millionths of an inch, \$350.00 Laboratory Set, 2 millionths of an inch. Price on application.



DoAll Grinder

Finest surface grinder made for high precision accuracy as to size, flatness and parallelism. Adaptable to wet or dry grinding.

AND SAVE THE SAW

The new DoAll Saw Clinic will show you how. Here is a modern clearithouse for tough sawing jobs. On the staff are engineers and metallurgis who do nothing but research work to determine the most efficient sespeed, feeding pressure, etc. to use on every kind of material. The servi costs you absolutely nothing. Just send in your actual jobs.

- Jobs you want to cut faster
 Jobs requiring a smoother finish
- Jobs that now cause saw breaka
 Jobs of hard-to-saw metals or alle

They will be put through a series of tests and a written report of resu and recommendations sent you.

oAll

The modern, efficient little metal cutters with extra hardened teeth. Made in a range of sizes and styles to cut every metal, alloy, plymetal, magnesium, synthane, etc.

100 feet of saw in each strip-

FREE SAW BOOK

out box.

Contains case histories of difficult sawing jobs.

Write for copy today.





Pat. 2,255,577 Des. 123,313

THE DOALL COMPANY

1206 Thecker St., DesPlaines, Ill.
Lecal Deall Offices (See your phone book)
distribute Deall Band Save and Floo. There

Local Deali Offices (See your phone book) distribute Deali Band Saws and Flies. They also sell and service machines and tools shown at left. FOR PRECISION AR PRODUCTION PLUS

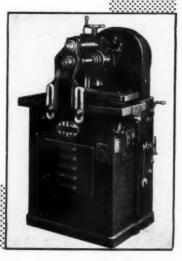
PLUS Speed... USE THE U.S. Multi Miller

FOR CAM-CONTROLLED INDEX MILLING, GRINDING, VERTI-CAL MILLING, SPUR GEAR CUTTING. HAND MILLING. AUTOMATIC CUT OFF. CON-TINUOUS MILLING OF BAR AND COIL STOCK, ROTARY MILLING, CONTOUR MILLING, CLIMB MILLING, BLIND MILL-ING AS DESCRIBED IN BULLE-TIN 90M.





U. S. Tool Company, Inc. Ampere, (East Orange), N. J.





THEY'RE DOING A "SWELL" JOB!



... and "hats off" to women operators like these and thousands of others who have stepped into industry to help fight this war!

Our superior allied battle-front action is dependent to no little degree on the skill and courage of our women on the production line. Long will we remember their great contribution.

BROACH GRINDING

Photos courtesy of LaPointe Machine Tool Co.

BAY STATE ABRASIVE PRODUCTS CO., WESTBORO, MASS. U.S.A.



SHIPBUILDING





U. S. Navy and private shippards are bending, punching, and shearing plate on Cincinnati Press Brakes and Cincinnati Shears. Cincinnati Shapers are working aboard. ships as well as in the yards.

Write for Recommendations

THE CINCINNATI SHAPER CO.

CINCINNATI, OHIO.



MACHINE

- MOTOR-IN-BASE DRIVE
- INFINITE SPINDLE SPEEDS
- * COMPLETELY HOUSED MOTOR DRIVE
- * STANDARDIZED SPINDLE NOSE
- * HEAVY RUGGED CONSTRUCTION
- * CENTRALIZED CONTROLS
- * DESIGNED TO GIVE YEARS OF SERVICE



SEND FOR DETAILED

J. L. LUCAS AND SON, INC.

BRIDGEPORT,

CONN., U.S.A.

ICAGO ST PRESS BR

> This No. 253 is a POWERFUL, rugged, inexpensive Press Brake, designed and built to the standards of Chicago Steel Form. ing Presses.

This money-saving production too. will handle 40 to 50 percent of the work done in an average shop. Greater speed, higher efficiencymuch lower operating cost-plus the highest quality material and sturdy welded construction as in our larger machines.

Standard Series - 3 sizes - capacities 14 gage, 4 ft. long; 16 gage, 5 ft. long; 18 gage, 6 ft long.

Heavy Duty Series-3 sizes-capaci. ties 10 gage, 4 ft. long, V die; 12 gage, 5 ft. long; 14 gage, 6 ft. long. Power. ed by % to 1% h. p. motors.

For additional information write

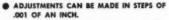
DREIS & KRUMP MANUFACTURING

7440 LOOMIS BLVD.,

CHICAGO, ILL.



MIDWEST ADJUSTABLE EXTENSION TOOL HOLDERS In use for FINISH REAMING Op on Cylinder Blocks in a Detroit A



- OPERATOR CAN MAKE ADJUSTMENTS BY HAND-NO TOOLS NEEDED.
- SET-UP TIME IS REDUCED.
- DESIGN IS SIMPLE, CONSTRUCTION RUGGED. ALIGNMENT ACCURATE.

HERE'S HOW THEY WORK

Midwest holders are provided with an extremely accurate, ground fit between the sleeve and the shank. A knurled, graduated collar which controls the adjustment is located at the top of the sleeve. A key fixed in the sleeve, with a sliding fit to a keyway in the shank provide a positive drive.

Micrometer, longitudinal adjustment steps of .001 of an inch are made by turning the collar one space on the bevelled edge, graduated scale. The collar holds firmly at all positions of the scale. There are no screws or locknuts to give trouble and, without tools of any kind, the operator can easily make the adjustment by hand.

MIDWEST TOOL & MFG. CO. . 2362 W. Jefferson . Detroit, Mich.

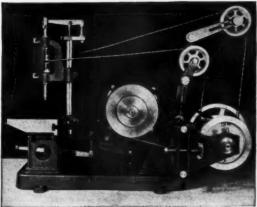
END MILLS . SLEEVES . COUNTERBORES . DRILLS CARBIDE TIPPED TOOLS . ADJUSTABLE HOLDERS





> 101

PRECISION PRODUCTION AT 23000 R.P.M WITH THE



Super sensitive

L & D HIGH SPEED DRILL PRESS

The L & D High Speed Drill Press is a precision production tool for work requiring drilled holes from .004° to 1/16° in diameter. Extreme sensitivity is obtained by balancing the spindle by means of the vertical component of the belt tension. This transmits the "feel" of even the tiniest drills directly to the finger-tip control.

The precision spindle is perfectly balanced so that absolute accuracy is maintained over long life, and drill breakage is kept at a minimum.

Eight speeds from 3,000 to 23,000 R.P.M. are standard. Machines with one, two, three or four spindles are

available to suit the precision requirements in all phases of watch and instrument manufacture.

Coupon

.......

Please send me the new L & D Super Sensitive Drill Press Folder.

NAME.....TITLE....

COMPANY

CITY___STATE____

EDWARD BLAKE COMPANY

'634 COMMONWEALTH AVE., NEWTON CENTRE, MASS.

BLAKE TAP GRINDERS — FILTAIRE PORTABLE DUST COLLECTORS — AMERICAN TOOL HOLDERS — BLACK DIAMOND PRECISION DRILL GRINDERS — L & D HIGH SPEED DRILL PRESSES



That's the whole story: turn it over and go on cutting! Double-Life Blu-Mol, a Millers Falls exclusive, is a high-speed machine blade with teeth on both sides. Special set differential eliminates drag and wear on the trailing edge; special heat treatment, leaving edges hard and ends and center soft, makes it super-tough. Priced only 50% higher, this blade will give you twice the service of the best single-edged molybdenum blade you've ever used ... proved in hundreds of shops nation wide.

TRY THIS BLADE

In the interest of your own business (cost cutting, efficient operation) and of America's war effort, (savings in steel consumption, shipping, storing, handling) determine DOUBLE-LIFE'S value for your needs. Put in a requisition now. Savings begin at once.

IT WORKS

Place in machine in usual way, first edge (A) down. As blade submerges in slot, edge B, set narrower than edge A, clears work freely, undamaged. When A is dulled, invert blade. Edge B then cuts as fast and free as first edge.

DOUBLE-LIFE Hack Saws

MILLEI MILLEI

DEVELOPED . PERFECTED . MANUFACTURED ONLY BY

MILLERS FALLS COMPANY

GREENFIELD, MASSACHUSETTS . U.S.A.



Precision Thread Grinding, Boring and Lapping Machines - Tool Grinders - Hydraulic Power Units - Grinding Spindles - Broaches - Continental Cutting Tools - Drill in Bushings - Diesel Fuel Injection Equipment Pure-Pak Container Machines - R. R. Pins and Bushings - Precision Parts * EX-CELL-O mound PRECISIO

made to your specifications



END MILLS—REAMERS COUNTER BORES— T SLOT CUTTERS

Illustrated at the left are a few of the specially designed cutting tools.

Mill River Tools have earned the highest reputation in many of the country's large industrial plants.

SEND YOUR PRINTS FOR OUR ESTIMATE—NO OBLIGATION

MILL RIVER TOOL CO.

336 WORTHINGTON ST.

SPRINGFIFIN MASS



Good Automatics DESERVE Good Operators

Good operators can get the most from any machine, and, because seconds count so much, automatics should be kept in use at peak efficiency.

The Departmental Design of Conomatics helps new operators to learn faster. The extra rigid cross-slide construction permits holding heavier forming cuts to closer tolerances.

Cone handbooks are useful in helping both new and experienced operators to get excellent results from Cone machines.

PRIME YOUR PRODUCTION PULLE - SPECIFY DOMES



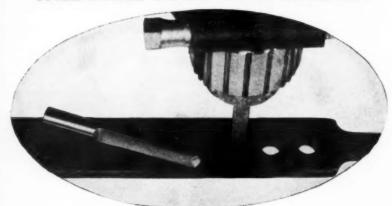
CONE AUTOMATIC MACHINE COMPANY, INC.





"HARDSTEEL"

WILL DRILL YOUR OWN SAMPLES



AT THE A. S. T. E. MEETING

Look for our working exhibit—watch us drill hardened steels and plastics—at the A. S. T. E. Meeting, Mechanics Hall, Milwaukee, March 25th to 27th.

Bring with you a sample of your own—any hardened steel or plastic part—and watch us drill it with a "HARD-STEEL" drill. If the piece is too big, bring a print and let's talk it over. We'll show you how to step up production, cut rejects, lower costs by the use of "HARDSTEEL".

Look for us in Spaces 107-8 and don't forget your sample.

BLACK DRILL COMPANY
5005 EUCLID AVENUE . CLEVELAND, OHIO
YOU HARDEN IT - WE'LL DRILL IT

"HARDSTEEL"

DRILLS . REAMERS . TOOL BITS . SPECIAL TOOLS



Rigidity and **Flexibility** Unparalleled Range

The most difficult milling, drilling and boring jobs are easy with the new Bridgeport. Here are a few of the advanced modern features that make such performance possible.

Angular settings in one plane are achieved by turning the hand wheel which controls the keyed overarm. Turret diameter is 15" with 5" overarm.

Column, knee and table construction are rugged with wide ways and taper gibs for accurate and vibra-

tionless operation. Table, knee and saddle locks are located in front for easy accessibility.

Graduated dials are 34" in diameter. Anti-friction bearings are used throughout.

Write for full details.

BRIDGEPORT: MACHINES BRIDGEPORT, CONN.

For Quick Delivery SUPER STANDARD CARBIDE-TIPPED REAMERS

For lower reaming costs, specify Super Standard Carbide-Tipped Reamers . . . get faster cutting, greater accuracy . . . many sizes in stock . . . prompt delivery on all sizes

Ask for New Reamer Bulletin

SOLID TYPE
Straight Shank

SOLID TYPE

Taper Shank

SEE OUR EXHIBIT at the 1943 MACHINE and TOOL PROGRESS EXHIBITION, MILWAUKEE, MARCH 25-27

SUPER TOOL CO.

21650 Hoover Road

Detroit, Michigan

CARBIDE TIPPED TOOLS

FOR TURNING . FACING . REAMING . SPOTFACING . BROACHING FORMING . GRINDER RESTS . WEAR PARTS . BORING . MILLING . DRILLING GROOVING . COUNTERBORING . SHAVING . CENTERS . SPECIAL PURPOSES

PRODUCE PRECISION Internal or External THREADS...FASTER

Below is shown set up for internal threading, the milling hob is revolved eccentrically about the work and simultaneously rotated into the work for the full depth of the thread. The cutter then rotates on its own axis and is carried around the work and simultaneously advanced by means of a lead screw to produce the desired helical thread.



NEW MURCHEY No. 32 THREAD MILLING MACHINE

Above is shown the spindle nose equipped with a hardened and ground 12cutter thread milling head for cutting external threads from 1" up to and including 4" in diameter. The same eccentric milling oction is employed as in the cutting of internal threads described above.

We also manufacture all types of Collapsible Taps, Self-Opening Die Hoads, Bolt and Pipe Threading Machines and Pipe Cutting-Off Machines. Featuring a unique eccentric milling action described above, the new Murchey Thread Milling Machine is setting new records for speed and precision in the production of munitions threads. For example, on one job it is cutting a 2-7/16" thread in the base end of anti-aircraft shells faster than one a minutel Internal or external threads from 1" to 4" in diameter and up to 3" in length. Maximum efficiency in operation is obtained through the completely hydraulic work cycle and the Reeves variable speed drive which permit the selection of exactly the right speed and feed for every job. And in the cutting of deep, coarse threads, the heavy box-type bed and the keyway in the fixture table help to maintain rigidity and perfect alignment. If you are looking for increased speed and maximum accuracy in munitions and aircraft threading, let us send you further details of the latest Murchey thread production equipment.

THE MURCHEY MACHINE & TOOL COMPANY

ELGIN PRECISION



Elgin's contribution to America's All-Opt. Victory Program includes Beach Esthern Seach Milling Machiner and Montribus Agricus and Montribus Agricus and Machiner Contribution of the mellitude of the precious spectations colladed by our contributions.

Precision Hand Screw Machine

> Bench Milling Machine

ELGIN TOOL

MACHINE TOOLS

on will find in all of them Elgin retained Machine Isols, mechanical Avances and refinements that permit it and accurate work to floor talerates, plus attributes and all-artimates, plus attributes and all-artimates, plus attributes and all-artimates are all artimates and all-artimates are all artimates and accuracy in a dequate a lesign and accupation care in construction.

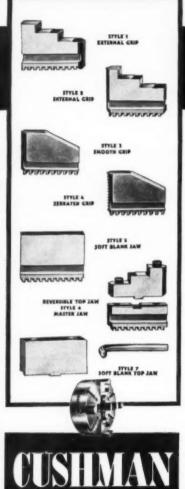


Precision Bench Lathe

Vertical Milling Machine

WORKS

1772 BERTEAU AVE. AT RAVENSWOOD AVE CHICAGO. ILLINOIS



know these jaws

CORRECT JAW SELECTION AND USE MAKES SET-UP EASIER, FASTER ...SAFEGUARDS EQUIPMENT, WORK

Let's not make the mistake, these days, of thinking that what is "old stuff" to us is equally familiar to the man or girl at the next bench.

Take this matter of Chuck Jaws, for example, sure, everybody knows what a Chuck jaw is...and how to hook 'em up. And yet we have plenty of trouble with people who don't use the right jaws in the right way, and thus cause themselves needless waste of time, material and rejected work.

So here is a brief description of the principal types of lathe chuck jaws and what they are used for. Just call it to the attention of your training director and the newer people in your shop. Might show it to some of the "old hands" too. Reprints can be furnished gratis on request.

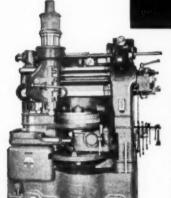
- STYLE 1 For holding work on external surfaces. Designed for holding forgings and castings on the O. D.
- FIVE 1 For holding rings or tubular shaped pieces on the L. D. Also for holding bars or rods within capacity of body center.
- STYLE 3 Commonly used on chucks holding arbors etc. Standard jaw equipment for milling machine tooling.
- STYLE 4 Commonly used for holding rough bar stock with extra work grip to prevent slippage on roughing cuts.
- STYLE 5 Commonly used soft and formed to properly engage work pieces of irregular contour or outline. Also used for 2nd operation work to provide soft gripping bites to prevent marring of work surfaces.
- STYLE 6 Designed to American standard dimensions to permit interchange of top jaws from one chuck to Jaws another. The design permits mounting of special top jaws of irregular or standard forms providing widest possible range of work-holding equipment.
- STYLE 7 Used in the same manner as Style 5 on chucks equipped with Style 6 master jaws.

These "Chuck Check" cards, giving the 6 most important rules of good chuck practice are available for distribution to your operators. Write us. The Cushman Chuck Company, Hartford, Connecticus



A World Standard for PRECISION

The Shop with a Gear Shaper can Cut More than Gears



CUTTER

6A-Type Gear Shaper

The Gear Shaper is "first choice" for the cutting of cams, splines, irregular and interrupted contours. The precision inherent in the Fellows-ground Gear Shaper Cutter, guarantees precision duplication of a given part at low cost. For details, write for our book of variety work "The Practical Art of Generatina".

THE FELLOWS GEAR SHAPER

Sunnen Precision Honing Assures Absolute

NTERCHANGEABILITY

OF PARTS!

• Amazing accuracy — with super-smooth finish (of 2 to 3 micro-inches) — makes possible absolute interchangeability of parts, saving production time and conserving vital war materials!

Consider These Important Advantages Handles internal cylindrical surfaces from .185" to 2.400" in diameter. No jigs or fixtures needed — work is held in the hands.

Low in cost — economical to operate! Fast! Can be "set up" for any size in its range in less than a minute!

Facilitates duplication of sizes. Relieves big internal grinders for other jobs.

Let a Sunnen engineer check your job in your plant with this equipment. Or write for free bulletin giving detailed information.

SUNNEN PRODUCTS COMPANY

7935 Manchester Avenue, St. Louis, Missouri Canadian Factory: Chatham, Ontario

SUMMEN



Aluminum Aircraft Link produces high finish



timer flearing Ring "Ac curately removes las 'leath' of stock."



Strict alignment maintained between two



ircraft Valve Tappet



on method of having it sed to secure a high finish and accuracy.



ones for Wheel Boloncing Machine "Accurately align hones two inter-



Saved time in producing 6 smooth, accurate finish on this bronze remote control valve body.



Aviation Hydraulic Cylinder made at Aluminum-Allay, Improves the quality of the bearing surface. An extremely smooth surface-finish is secured.



Brawing and Blanking Die "Saves time in producing smooth have metal flaith."



Diesel Engine Fuel Injector Cylinder "So accurate that a piston can be fit within 00005 inch."

Machines, Accessories and Attachments for a Wide Variety of Needs:



Rotary Head Milling Machine



Autometric Jie Boring Machine



Milwaukee Midgetmill



lilwaukee Speedmill



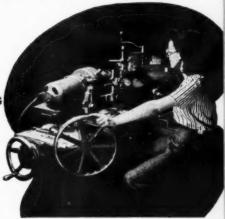
Milwaukee Face Mill



Center Scope

THE MILWAUKEE FACE MILL GRINDE GIVES YOU ALL THREE!

- UNUSUAL RIGIDITY
- REDUCED SHARPENING TIME
- ACCURACY TO WITHIN .0002



THE basic design of the Milwaukee Face Mill Grinder mbodies strength, precision, and capacity. It is capable of sharpening Tungsten Carbide Cutters ranging from 3" to 16" in diameter - grinds the blades to within .002. Set-ups are quickly made with graduated dials, facilitating adjustments. Other controls are handily located for simplified operation.

OTHER IMPORTANT FEATURES:

setting of 15° on either side,

6. Spindle has No. 50 National

7. Blower system at slight extra

5. No adapters necessary.

Standard Taper.

- 1. Jeweled bearing dial indicator for accurate checking.
- 2. Finger tip control.
- 3. Fine thread precision saddle screw.
- 4. Hand screw permits angular
 - cost. For complete information write for Bulletin No. 41A

Buy Victory with at least 10% in War Bonds!

Rearney recke



Produces true and accurate holes by correcting machine tool misalignment on hand screw machines, automatic screw machines, tapping and drilling machines of all kinds. and multiple spindles.

Available in stock are five standard sizes of holders with taper or straight shanks, with capacity up to 5" tool diameters. Prompt make-ups on larger or special holders are easily accomplished and our engineers are ready at all times to assist you in solving your special problems.

SEND FOR BULLETINS ON ALL OUR UTILITY TOOLS

THE J. C. GLENZER CO., INC.

6465 EPWORTH BLVD. DETROIT, MICH.

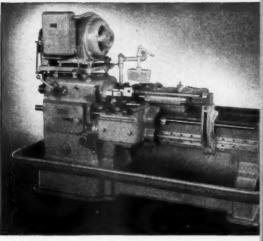
So-swing MODEL LR LATH

For Economy and Consistent Accuracy on Volume Production or on Short and Medium Runs

Model "LR" is a fully automatic, cam-operated lathe, incorporating the time-tested Lo-swing principle of sufficient mass and rigid tool support. Its field includes practically any work within its capacity—2" diam.

for normal stock removal, 4" diam. for light cuts, 5" diam. for flanged work — and up to 46" between centers in the longest bed length. This machine, while offering the utmost in flexibility, is 100% mechanical without any clutches in the feed train. Not only is the "LR" a very simple machine to service, but once set it cannot get out of time. All rotating shafts are anti-friction bearing equipped. Lubrication is adequate and automatic. Carriage ways are of hardened steel to provide greater wear resisting qualities.

Ease of set-up and operation are provided by the built-in Seneca Falls CHANGE-OVER MECHANISM by which length of carriage streke may be quickly varied; CONVENIENT LEVERS for throwing in and out the feed and



rapid traverse (normally automatic) manual and by the LOW CENTER HEIGHT (37") wh allows the operator to examine and adjust tools from the operating position. Low cen height also contributes to ease of loading

Model "LR" Lo-swing is designed to provi maximum efficiency with carbide tools. It is versatile lathe in that it may be equipped we either direct V belt drive to the spindle high speed, fine finishing cuts, or a gear drive with pickoff gears for slower roughi cuts. The Model "LR" Lo-swing may also equipped with a Third Slide (overhead) well as additional back-squaring attachmen carriages and carriage slides, making innumerable tooling possibilities.

SENECA FALLS Automatic WORK DRIVER



Self Centering...Quick Acting...No Slip. Attaches to any chuck plate or spindle. Provides a positive, balanced drive which reduces chatter. Handles rough forgings or turned pieces—straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.

SENECA FALLS MACHINE CO. SENEC



FOOT CONTROL LEAVES BOTH HANDS FREE TO WORK!

Features: Vise opens and closes instantly... Remains open or closed without constant foot pressure... Exerts grip of 15 times air-line pressure... Measures 12 x 6 ½ x 6 in.... Jaw width 3 in.... Jaw depth 2 in... Maximum opening 3 in.... Maximum travel ½ in. Attaches to air line or individual compressor.

SPEEDY AIR VISE complete with Foot Control Valve, Air Hose and Fittings.

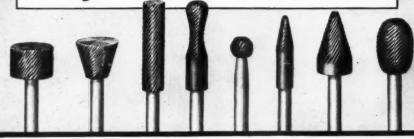
Want more production? Follow the example of leading war plants — put Speedy Air Vises to work! This foot-controlled, pneumatic vise leaves operator's both hands free for safe, fast insertion and removal of work. You'll find it cuts time, labor and costs, reduces fatigue. Sturdy, compact, precision-built . . . so low in price it can be economically used on every drill-press, miller, filer and assembly line. Prompt delivery. Askyour distributor or write for details.

W. R. BROWN CORP. 5724 ARMITAGE AVE. CHICAGO, ILL.

AMERICA'S MOST TALKED-ABOUT VISE . . . AT A PRICE

FORD

A Right TOOL FOR EVERY FILING NEED



8 of many available shapes

Ford devotes its entire attention to the *one* job of making better rotary filing tools.

Special methods produce hard biting, fast cutting tools that stay sharp longer —and stand up longer.

Because neither hand cut files nor ground cutters are all purpose filing tools, we make both types.

Each has its specific applications. If in doubt, consult our engineering department.

Look into this complete line,

Catalog showing many shapes and sizes sent on request. M. A. Ford Manufacturing Company, Inc., 746 W. First St., Davenport, Iowa.

Ground Cutters — miniature milling cutters of high speed steel, ground from solid after hardening. Perfectly balanced. Can be resharpened many times

to original keenness.

Rotary Files—hand cut from a special grade of high speed steel. Scientifically heat treated after teeth are cut.



THE MARK OF A GOOD FILE

FORD

GROUND CUTTERS



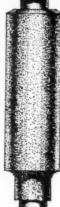
ROTARY FILES

T RITON

The fundamental basis of all war production is precision and speed.

Substitute your flush pin gauges, snap height gauges, etc. for special dial indicator gauges. They are:

MANY TIMES FASTER IN OPERATION. NEVER WEAR OUT. MAKE NO MISTAKES IN READING.



We will design special dial indicator gauges to meet your requirements.

Write and tell us your problem—we might have the solution.

SPECIAL TOOLS
RING GAUGES
PLUG GAUGES
SNAP GAUGES
AND SPECIAL GAUGES

PROMPT DELIVERIES

TRITON PRECISION

CORD.

GAGE AND TOOL

MANUFACTURERS

1302 INWOOD AVE. N.Y.C.

A New Releasing Model Acorn Type Die Holder



Complete details in Catalog No. 3. Write, wire, or 'phone for a copy. Send for name of ALCO representative in your vicinity.

ALCO

The greatest improvement in an Acorn Type Die Holder for use on Screw Machines and Turret Lathes.

Wide range of sizes for dies from \('' \) to 1 \('' \). Each tool is quickly adjustable to take several diameters of dies.

Every minute, every hour of efficient production time becomes more valuable and more necessary as the demands of our armed forces increase. Make every minute count—adopt the most efficient tools and methods to stop waste, speed up production, save man hours, and get this global war job done. Then be ready for the new era

The Alco Tool Co.

of production after the

- The only acorn type releasing model with adjustable concentric alignment.
- Absolutely rigid drive effected without the use of pins.
- Produces perfect work even on old machines with worn turrets or bearings.
- Exact alignment of die accomplished through use of ground contact surfaces
- Quick and positive set-up of die absolutely concentric with the work.
- Ample allowance for chip elimination and proper lubrication.
- Forget thread inspections all are cut perfectly — no rejects.

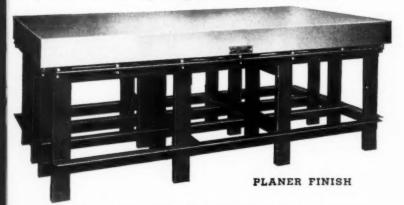
ALCCTOOLS

Detroit Office - 908 Stephenson Blds.

peace.

Challenge SEMI.STEEL LAYOUT SURFACE PLATES

... Are on the job when a true, rigid surface is required for layout, inspection or assembly work, made of special analysis semi-steel, planed perfectly smooth and square, these layout surface plates are lasting, dependable and accurate.



AVAILABLE IN EIGHT STANDARD SIZES

from 30x60 inches to 54x144 inches (all 6 inches thick) with or without the strongly reinforced all-steel stand. arc-welded to produce absolute rigidity. (Shown above). This stand is equipped with lock leveling screws which enable the user to level his plate quickly and securely. Special sizes, including extra large, made to order. ***

The CHALLENGE MACHINERY COMPANY

GRAND HAVEN 1991 50 M MEET MICHIGAN, U.S.A.

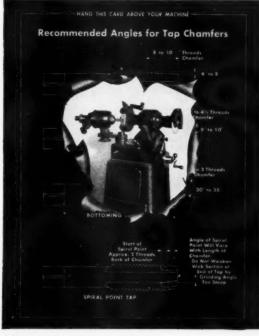
EASTERN SALES OFFICE:



50 CHURCH ST., NEW YORK

WAR-TIME SHOP RECIPES





TAKE (1) All your dull or worn taps

- (2) "Detroit" Tap reconditioning wall chart, as illustrated
- (3) "Detroit" Tap Reconditioner

Then grind taps on the Reconditioner according to instructions on the wall chart and put them back to work—as good as new. If you don't have a copy of this wall chart, write for one today on your company letterhead. Ask for Chart No. RTC.

DETROIT TAP & TOOL CO.

8432 BUTLER STREET, DETROIT, MICHIGAN, U. S. A.

OBOUND TAPS, THEEAD GAGES,
THEEAD HOSS A SPECIAL THEEADING
THEEAD HOSS A SPECIAL TAPPING MACHINES
TOOLS SPECIAL TAPPING MACHINES



HOW TO MAKE IMPORTANT SAVINGS ON FINISHING OPERATIONS

Grinding...Sanding...

Polishing...Rotary Filing...

Wire Brushing

COSTS ARE LESS ON HASKINS

1/2 H.P. heavy duty with multi-speed of tershaft drive and b high pedestal m

HASKINS Flexible Shaft Equipment is built to last. To give longer, trouble-free operation. To handle easier. That's why many finishing operations cost less-much less-per man and machine hour on Haskins equipment. There are 30 different Haskins units, each engineered to do many kinds of jobs. Your men work faster with these easy handling machines. Maintenance costs are less. Haskins Flexible Shaft Equipment can take it-and give iti-on vital war production. Catalog 45 shows many interesting applications. Write for a copy.

R. G. Haskins Company, 623 S. California Avenue, Chicago



HASKINS Flexible Shaft

EQUIPMENT

More VERSATILE Machines for More PROFITABLE Work



MACHINE SHOP-FOUNDRY-DIE SHOP-There's a Haskins unit for every shop requirement. With the right mounting. The right power. The right drive-direct or multi-speed countershaft-for sanding, polishing, heavy duty grinding, rotary filing and wire brushing.

there IS a difference in taps

Shiring the state of the state

GRINDING for example:

All Sossner taps are PRECISION GROUND FROM THE HARD-ENED SOLID STOCK, ... an important reason for their strength, accuracy, and long life. Sossner taps are made with the very latest equipment, using our own newly developed methods.

TAPS AND GAGES OF AMERICAN NATIONAL AND BRITISH THREAD FORMS IN SPECIAL AND STANDARD SIZES

TAPS.

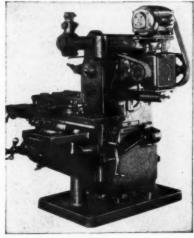
SOSSNER

STEEL STAMPS

161 Grand St., New York City or 27 B'way, Lynbrook, N.Y.

"32 year reputation for reliability and precision workmanship."

DRIVE The



GREATER **PRODUCTION** STARTS HERE

DRIVES FOR

Lathes, Shapers, Planers, Milling Machines, Punch or Drill Presses. Grinders of All Types, Any Machine Tool.

ONLY when the drive is right, can production be right. Don't blame the age of a machine tool if it is not producing-blame the drive. Give it a Berkeley close-connected unit drive and it will give you new machine tool results. It's a quick, easy change because the Berkeley engineered welded steel bracket assures a perfect fit, without gadgets every time. Then your machine tools are ready for the higher speeds and deeper cuts required to day. The facts will convince you-write or wire for them now.

Berkeley

Power Drives

V-Belt

BERKELEY EQUIPMENT COMPANY

(Formerly located at Corry, Pa.

New Plant and Office: 1021 Bahis Street Danville, III.

PRODUCTION

GREATER

WELDER SALES SPOT · BUTT · ARC

We manufacture a complete line of resistance spot welders from 1/4 to 300 KVA for all types of welding. There is an EISLER WELDER for every purpose.

WRITE FOR CATALOG

WE INVITE CONTRACT SPOT WELDING IN LARGE OR SMALL QUANTITIES.



ARC WELDERS



BUTT WELDERS



SPOT WELDERS



FOOT, AIR
OR MOTOR OPERATED

CHAS. EISLER EISLER ENGINEERING CO.

762-SO. 13th ST. New AVON AVE NEWARK N. .



14 ANGULAR PISTON HOLES IN PUMP CYLINDER

Rough and Finish Bored on Two-Spindle

STOKERUNIT SIMPLEX Precision BORING MACHINE

Two holes are bored simultaneously, work being indexed manually to next set of holes in same angular direction. Work is then transposed in fixtures to bore alternate holes.

Girl operator maintains ac-curacy, finish in production.



The 14 angular piston holes in this pump cylinder alternate directionally at 18° angles. To insure the required accuracy in all dimensions, precision boring equipment is indispensable.

On this job, No. 1 Stokerunit Simplex Precision Boring Machines with two spindles are maintaining close tolerances throughout. Diameter of rough bore is .3594" and is held to $\pm .001$ " with stock removal of .020"-.025". On the finishing operation, diameter of bore is .4053" and is held to ± .00015" with stock removal of .012"-.015"; high finish is assured. Radial location is held to .003" on both operations. Length of bore 1".

Actual boring time on both operations is 20 seconds per hole, two holes being bored simultaneously. Feed is 3" per minute; speed 1750 r.p.m. Stock is

50,000 tensile iron.

OVER 25 MODELS of Stokerunit Simplex Precision Boring Machines are available in mechanical or hydraulic feeds, with single or multiple spindles, for short-run or production work. Among them you may find the model which will meet your precision boring problems.

Get our complete story now. For recommendations, send blueprints of parts with your production problems.

No obligation.

WRITE TODAY for these two booklets covering our entire line of Simplex Precision Boring Machines. Complete data included.



STOKERUNIT CORPORATION

DESIGNERS AND BUILDERS OF PRECISION BORING MACHINES AND MILLING MACHINES 4530 WEST MITCHELL STREET

A HIGHLY DEVÈLOPED LINE.



MA 8—Eight speeds. 1200 to 12,000 R.P.M. Small work up to %". Built-in motor. Bench and column types. 1 to 6 spindles.



Type B—No. 1, No. 2, No. 3 sizes. Hand feed drilling units. Hand feed tapping units. Power feed drilling units.

avey

ONLY years of the dy development can evolve the dilling equipment that is found in the Avey Line of Sensitive Drilling Machines.

The advances required in mechaling methods caused by the domands for greater entput, necessitated more efficient drilling equipment. Avey Drilling Machines have steadily led the field.

Avey High Speed Semitive Drilling Muchines are built-in types and sizes to cope with varied needs. They are designed in capacities from the smallest drill gauge size to approximately 1½ lackes.

Boing hall hearing throughout, they rate the highest speeds without vibration. This feature insures maintained accuracy.

The Avey Catalog details the line of Avey Drilling Machines and Drilling Machine Accessories.

Avey Engineers will come to your aid in solving new and different drilling problems.

Individual Motors for each Spindle. Single and Multiple Spindles.

AVEY
DRILLING MACHINE CO.
CINCINNATI · OHIO



MA 6—Six speeds. No. 2 and No. 3 sizes. Built-in motors.



Belted quick speed change machine. No. 2 size. Four speeds. Standard frame motors.



DRILLING



These days the hungry mouths of America's blast furnaces can use every bit of scrap iron and steel they can get—and more. But they don't want good tool steel that has ended prematurely on the junk heap through carelessness and faulty grinding.

Now's the time to take a good critical look at your tool-sharpening operations. Are they modern, up-to-date? Do they conserve and protect the life of your precious tools?

Grind the CIRCULAR RELIEF

way



CIRCULAR RELIEF GRINDING makes tools last longer because it sharpens efficiently without needlessly cutting away valuable metal. Moreover, tools are ground with one machine, in one operation—an operation so simple that inexperienced men can handle it.

Take a look at the diagram below for a comparison between CIRCULAR RELIEF GRINDING and conventional methods. Then send for our free folder telling the whole story. Do it today. Start conserving your precious tools *mou!



Comparing Liftbulks RELIET With Conventional Grinding Note how CIRCULAR RELIEF GRINDING follows the curve of the tool, grinds right up to the cutting edge, and does not cut away valuable metal supporting the cutting edge.

GLEVELAND TOOL ENGINEERING COMPANY

9102 DETROIT AVE. . CLEVELAND, ONIO

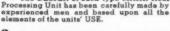


POT FURNACE

MAHR Standard Pot Furnace with hood for cyanide, etc. Made in many sizes and types for different work, including rectangular type for molten bath.

TOOL FURNACE >

MAHR Standard Tool Furnace. Under fired to 1800° F. for regular tool steels. Over and under fired to 2600° F. for high speed tool seeds.



- 2. The CONSTRUCTION is in turn based upon the design so that each factor of that design is certain of operational fulfillment,
- 3. The MAHR METHOD OF FIRINGproven through more than a quarter centuryassures fullest operational performance in quick heat up, maximum production, exact quality of treatment and longest life of the unit and its parts.

It all adds up to engineered performance-ability! When you install a MAHR heat treater, you don't guess at its performance—you KNOW! Ask any of the thousands of users, large and small. Whether it's a circular or rectangular pot for molten bath, a recirculating pot, a tool furnace, a standard heat treater, a large hardening, drawing or carburiz-ing unit or any type of heat processing unit, ask us for complete data and prices. Write, wire or phone TODAY.

Sales Offices in Principal Cities

MAHR MANUFACTURING CO. DIVISION OF DIAMOND IRON WORKS, INC.

1713 North Second St., Minneapolis, Minn.,

SMITHING FORGE

MAHR Open Top Smithing Forge with blower furnishing primary and secondary combustion air, and air for air curtains.



MAHR Lead Pots in hard use in a large battery manufacturing company's plant.

AT TREATING NEED

Annealing Carburizing Baking Hardening Forging **Drawing** Stress Relief

Car Bottom Pit Pusher Roller Hearth Cantinuous Rotary

Furnoce Types: Other MAHR Equipment: **Rivet Forges** Torches Burners Blowers Valves **Smithing Forges**





For Perfect Performance at High Speed be sure your taps are kept sharp - - and if they are WINTER H.S. Taps you may be sure they will stay sharp for long hours of fast operation.

No tool, however well made, can produce its full quota if abusively handled. If some of your newer employees don't know how nicely Winter Taps will perform if properly used; ask for the Winter Tap Data Booklet. Lots of non-technical, useful information in it on taps and tapping. A postal request will bring it.

A Division of

THE NATIONAL TWIST DRILL & TOOL CO. DETROIT, MICHIGAN



GRINDING SET-UPS LIKE THIS Mean LOST MAN HOURS ...

LOST MACHINE HOURS



You Can Be Sure of FULL PRODUCTIVE GRINDING TIME When You Use The MAGNA-SINE

The angular grinding set-up on the Magna-Sine, as shown directly above, was completed in one twelfth the time required for that shown at upper right. It eliminated the need for V-Blocks, angle plates, sine bars, clamps and strap.

In addition to reducing set-up time to an absolute minimum, the Magna-Sine's precision construction makes possible the most accurate angular grinding work. Every angle is held to the same accuracy as the standard gage blocks which are used.

Magna-Sines are supplied in two sizes in both compound, and single angle models. Non-Magnetic models are also available for inspection purposes.

Write for full details.

ROBBINS ENGINEERING CO

318 MIDLAND AVENUE

COMPANY

DETROIT MICHICAN

Besly Taps in greater volume but they must be good Taps

We are increasing production at a remarkable rate but not at the cost of quality. Now or after the present emergency remember Besly when you want low cost tapping operations. . . . If modern equipment, careful supervision and inspection, knowledge of proper design and constant research can give it to you, BESLY TAPS will be your choice.





Send for a copy of Besly Tap Catalogue, containing many valuable reference tables and other instructive information.



CHARLES H. BESLY & COMPANY

118-124 NORTH CLINTON STREET • CHICAGO, ILLINOIS FACTORY: BELOIT, WISCONSIN

on the PRODUCTION of EXTERNAL and INTERNAL THREADS



The Coulter Type "H" Hob Thread Miller—modern in every detail of design and construction—handles high speed, accurate production of right or left hand threads. Any parts that can be held in ordinary chucks, air operated chucks, air operated chucks, air operated collet chuck or special face plate fixture can be threaded on this machine.

Work holding spindle and cutter spindle are driven by individual motors through worm and gears. Speed changes to work spindle are accomplished by pick-off gears; cutter spindle speeds are controlled by variable motor sheave. All high speed shafts turn in anti-friction bearings.

Maximum external thread, 71; minimum hole depends on smallest hob practical.

Send for Descriptive Bulletin giving full information.

The James COULTER Machine Co. BRIDGEPORT . CONNECTICUT . U.S.A.

THE ANSWER TO THE GRINDING OR HONING PROBLEM THAT HAS BEEN RETARDING YOUR PRODUCTION FREE! MAY BE FOUND IN THIS HELPFUL LITERATURE FREE!

Send for it TODAY
...it's FREE!





In addition, you are cordially invited to use our engineering service.

Let our trained abrasive specialists solve your problem for you ...THAT'S ALSO FREE!



MID-WEST ABRASIVE COMPANY

Manufacturers of DEPENDABLE Abrasives

1960 E. MILWAUKEE AVENUE

DETROIT, MICHIGAN

MID-WEST ABRASIVES

SPEED UP SMALL PARTS MILLING

NICHOLS HAND MILLING MACHINES

Give you full advantage of high cutting speeds

Engineered for volume production of small parts with high-production tool efficiency and economy • Speedy Set-up • High Precision • High Speed • Rugged design and durability make it ideal for small parts milling.

May we send you illustrated bulletin?

SPECIFICATIONS

Longitudinal feed, 10°. Transverse feed 7°. Vertical feeds of knee, 13½°. Vertical feeds of knee, 13½°. Vertical movement of head, 4½°. Micrometer dials on Transverse and Vertical feeds. Spindle speeds 100, 200, 800 and 1200 r.p. m.



WALTHAM, MASS., U. S. A.

5.4



SUTTON TOOL CO.

send for Catalog 15



COLLETS



A tool that saves time is a great contribution to the safety of this nation. A tool that saves money is a safeguard against non-profit and loss to your shop. R and L is just such a tool.

Speed is the keynote of this vast defense production schedule. This Turning Tool increases production by reducing set-up time, by speeding up cutting, by doing right and left hand turning (it requires only ten seconds to change from a right to a left hand turning tool), and by performing several operations simultaneously.

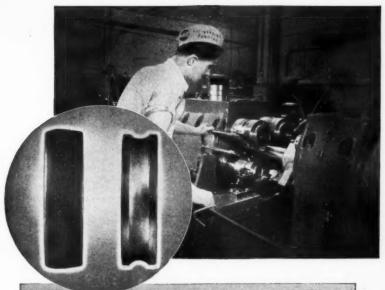
A savings of over \$200 is realized on the initial cost alone. R and L costs less than one-fourth of the tool which it replaces (14 in all). And, because they are simply and ruggedly built, they retain their accuracy, thereby saving maintenance costs. It does away with the reconditioning of extra tools when worn, or replacing when lost.

Write for booklet describing this and Tap and Die Holder, Roller Backrest and Universal Tool Post.

R and L Tools

1827 Bristol St.,

Nicetown, Phila., Pa.



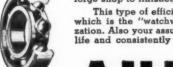
NON-STOP Performance

in CJB Bearings as well as in chucking machines.

AUTOMATIC EQUIPMENT increases efficiency and consequently improves quality of the product.

The four spindle Chucking Machine shown above operates continuously with no stop for loading or unloading. It completely machines forgings into bearing races which is the first step in production—from

forge shop to finished bearing.



This type of efficiency and planning promotes QUALITY which is the "watchword" throughout the Ahlberg organization. Also your assurance that (GJB) Ball Bearings give long life and consistently good performance.



Out West als PRECISION BEARINGS, INC. Los Angeles



CERROMATRIX (Melting Temp. 2500 F.) For securing punch and die parts, anchoring machine parts without expensive drive fits, for engraving machine models, stripper plates, chucks, short run forming dies and other metalworking applications.

CERROBEND (Melting Temp. 1580 F.) Used as a filter in bending thin-walled tubing to small radii. Easily removed in boiling water. Also used for aircraft assembly jigs, templates for forming dies and other purposes.

CERROSAFE (Melting Temp. 1900 F.) Used to accurately proof-cast cavities such as molds, gun chambers, forging dies, etc.; as a filler behind delicate parts to be machined or ground in profiling or duplicating machines; sprayed on to protect wood core molds and patterns. Low temperature melting prevents distortions.

WRITE for literature on any of the above alloys. Prompt deliveries on orders bearing Preference Rating of A-1-J or better.

These three low-temperature melting alloys are helping to speed up production of war materials for Army, Navy and Air Force.

Representatives and Distributors

Brooklyn, N. Y., Belmont Smelting and Refining Works
Ansonia, Conn., Jackson Associates
Boston, Mass., Jackson Associates
Boston, Mass., Jackson Associates
Boston, Mass., Louis, Me., N.
Philadelphia, Pa., Castaloy Metal Sales Co.
Cleveland, Ohio, Die Supply Co.
Detroit, Mich., Castaloy Metal Sales Co.
Moline, Ill., Sterling Products Co., Inc.
Los Angeles, Cali
Moltreal, Can., 1
London, Eng., Mining & Chemical Products, Ltd.

Minneapolis, Minn., Northern Machinery & Supply Co. St. Louis, Mo., Metal Goods Corporation Kansas City, Mo., Metal Goods Corporation New Orleans, La., Metal Goods Corporation Dallas, Tex. Metal Goods Corporation Houston, Tex., Metal Goods Corporation Los Angeles, Calif., Castaloy Metal Sales Co. Montreal, Can., Dominion Merchants, Ltd.

CERRO DE PASCO COPPER CORPORATION

40 WALL STREET

NEW YORK CITY

THE Cleveland NO. 11/2 Horizontal Production MILLING MACHINE

"You asked for" this one, too

Write for new Bulletin "B"

Like the Cleveland No. 1 Vertical, the No. 1-1/2 Horizontal was designed to fill a specific need. Operators like it because it is fast, convenient, rigid and accurate. It sets up quickly to show a profit on leng and short runs alike. Note particularly the data in the large arrow below.

Self-oiling Outboard Support

> Timkenmounted Spindle

Table of the line of the district of the distr

Lead screws mounted on Timken bearings Housed Electric Panel

Extremely Rigid Column

COMPANY

Other Features. 8 spindle speeds provided by pick-off gears and back gear: 50, 130, 175, 250, 360, 520, 700, 1000 r.p.m. Gears for intermediate speeds extra. 15 standard feeds 1/2" to 18" per minute. Automatic able cycle, automatic spindle brake, one-piece column, wide knee bear-

ing, anti-friction bearings. Sliding gears mounted on multiple-splined shafts running in Timken bearings; table and saddle lead screws similarly mounted; all gears heat-treated and shaved. Enclosed multiple V-belt drive. Table working surface—10-1/2"x36". Get our new bulletin.



THE SOMMER & ADAMS

Custom-Built EQUIPMENT FOR MANY PURPOSES

CANEDY-OTTO

Canedy-Otto has been the manufacturer of first-class, high-grade drilling units since 1892. These units are available in single spindle, multiple spindle and radial.

We can help you solve your drilling problems. Send for information on our complete line.

USED THE WORLD OVER

SPECIFICATIONS:

Drills to the center of circle on base or table

Drills to the center of circle on base or stength of arm
Greatest distance from spindle to base Minimum distance from spindle to base Minimum distance from spindle to column Traverse of spindle
Hole in spindle—Morse Taper
Diameter of spindle at nose
Traverse of head on arm
Traverse of head on arm
Spindle speeds with 1200 RPM moter

Spindle speeds with 1800 RPM motor

Feeds per revolution of spindle

9" Column

Bearing of arm on column Size of main driving motor Height of drill column over gears Working Surface of Base Net weight

3' Arm	4' Arm		B'	Arm
731"	86"	120"		
493"	4"	46" 17" 10"		
91"	15"	170		
103"	4° 48″ 15″		10	070
No. 4	No. 4		No.	1"
910	361"		2	100
253"	361"		48	! "
(60, 85, 130, 180,		on	all	models
(425, 560, (1200 RPN	860,			
(85, 130, 1 (560, 860, (1750 RPM	1160.	on	all	models
(1750 RPM				
(.004" .007 (.010" .020	100	en	all	models
	16"	18"		
2 HP. 89"	2 HP.	2 HP.		
29"x45"	36"x60"	36"x88"		
4000 lbs.	6200 lbs.	7000 lbs.		

EARLY DELIVERY POSSIBLE

11" Column 11" Column

CANEDY-OTTO MANUFACTURING CO.

> CHICAGO HEIGHTS, ILLINOIS

GUIDE TO SATISFACTION!

 $W_{
m e'd}$ rather make a few products WELL than a score of products of indifferent quality. That is why we have specialized for 20 years in making circular metal cutting saws, drills, combination center drills, and

By thus concentrating our efforts we can streamline our production and maintain exceptionally high standards of quality without correspondingly increasing prices.

The steadily growing demand for Circle "R" Products is convincing evidence that our creed is your guide to satisfaction. Even our enlarged plant, containing 20,000 square feet of floor space, is taxed to the limit to meet delivery requirements.

CIRCULAR TOOL CO., INC., Providence, R. I. CHICAGO . PHILADELPHIA . NEW YORK . DATTON . CLEVELAND . STRACUSE

INDIANAPOLIS . DETROIT + ST LOUIS



A.C.E. FOR Special CUTTING TOOLS

MANUFACTURED TO CUSTOMER'S BLUEPRINTS

A.C.E.'s MODERN METHODS

Above is shown a five spindle indexing fixture for milling spirels—one of A.C.E.'s advanced methods winning at the gool of precision mass production.

At right—A.C.E.'s MODERN Inspection Methods exemplified by a sine her specially designed by A.C.E. Engineers to Improve Inspection of high precision cutting tools.

Have us quote on your special cutting tools for attractive deliveries and prompt estimates

AMERICAN CUTTER

AND ENGINEERING CORP., WARREN, MICH.

SPECIALIZING IN HIGH SPEED CUTTING TOOLS TO YOUR PRINTS

18 0.33

CERTAIN TERRITORIES OPEN FOR ACTIVE AGENTS

WRITE FOR NEW ILLUSTRATED BULLETIN

AMERICAN CUTTER & ENGINEERING CORP., 31741 MOUND RD., WARREN, MICH.



Fighting planes were grounded—inside the factory! Production was slowing—soon would stop unless critical hose could be had immediately. Not a foot of it anywhere in the City—ordinary shipments would arrive too late. What to do?

Just one thing to do—and the plane manufacturer did it! He called in his Mill Supply Distributor, who right away got the rubber company on long distance.

That night one of his men hopped the Limited — picked up the hose next morning — made an extra sleeper reservation— and traveled back with all that hose in a berth!

That emergency delivery kept planes pouring down the line and saved the manufacturer a full week's production. Nobody erer will know how much those extra days' output have helped to speed the Peace!

It was all in the day's work for the Distributor. But it carries a big moral:— in a pinch or before a pinch, always call in the Industrial Supply Man.

You can depend on his resourceful help-we

know you can, because for many years he and other Distributors all over America have represented us in selling Cle-Forge High-Speed Drills and Peerless High-Speed Reamers.





Awarded May 22, 1942 Superseded July 13, 1942



4919 SECOND BLVD. DETROIT LORDON - L. P. BARNUS, LTD. - 35 JG JF LPPER THAMES ST. E.C. 6





Awarded August 8, 1941

"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU

GRENBY

Makes a full line of Precision Grinders



EG-10

Power or Hand Feed 8" Between Centers



INTERNAL

Power or Hand Feed Grinds 1/8" to 3" Holes



FG-1 FLUTE GRINDER



S-1 SURFACE GRINDER



TRS-1 CUTTER GRINDER

HE GRENBY MANUFACTURING CO., PLAINVILLE, CONN.



2, 3, and 4 SPINDLE MACHINES for Multiple Drilling and Tapping



When minutes are precious as they are right now, whole days of production can be saved each month by using Atlas Drilling Machines on parts that require

a series of drilled and tapped holes. These inexpensive, efficient machines have massive production oil tables; solid type iron legs. Drilling heads are Atlas 4 SKF ball bearing floating-drive design with new crank-type head raising mechanism.

Investigate the speed-up possibilities of Atlas Drilling Machines. They are setting new operating records in many of the nation's largest plants. Atlas Press Company, 350 North Pitcher Street, Kalamazoo, Michigan.



OTHER ATLAS EQUIPMENT FOR WAR PRODUCTION



LATHES SHAPERS Backgeared, Handle all work screw-cutting within a 7" lathes with V-belt drive, stroke accu-power cross rately, quickly.



MILLING MACHINES Compact, power-

ful bench millers for full range of milling work.



Correct Grinding Methods rtena Use Care in Finish Grinding KENNAMETAL Tools CRIND TOP STYLE 3 TOOL





In finish grinding it is best to use the face of a large cup or rim wheel as shown. The top of the tip is ground first, setting the table rest at the finished side rake angle desired.



GRIND END

Set table rest at the finished front clearance angle desired. If the clearance on the tip is made 2° to 4° less than the clearance on the shank, the wheel contact will he on the carbide tip only.



CRIND SIDE

Grinding the side clearance and side cutting edge angles is the last step in hnish grinding KENNAMETAL tools. As in roughing, wet grinding is preferred.

For finish grinding of KENNAMETAL, a large cup or rim wheel between 90 and 120 grit on a wet grinder is recommended. Keep the tool moving back and forth across the wheel since the large tool rest used to true up the angles does not permit rocking the tool. Dressing the wheel with about 1 32 inch of crown in the center of the face decreases the area of contact and permits better cooling. If the finishing must be done dry, be very careful to keep the wheel sharp enough that no heat coloring shows on the tip or shank steel at any point. Tool radius is formed by rotating tool from the side cutting edge to the end cutting edge, blending the radius tangent to the side and end cutting edges.

Diamond impregnated bakelite wheels of 220 grit are very satisfactory for finish grinding. Honing is reported to increase tool life on light cuts.

*INVENTED AND MANUFACTURED IN THE U.S. A







No need to remove work for angular milling. Head can be swiveled 25° each side of vertical in transverse plane.



Quick set-ups on workpiece—head rotates 360° in longitudinal plane. Belt guard swivels to any position.

Write for our folder giving complete information.



Note that the unit is reversible on the overarm for most convenient positioning (compare with opposite photo). All movements readily duplicated by graduated scales.



MACHINERY MANUFACTURING COMPANY

Vernon Line of HORIZONTAL MILLS, VERTICAL MILLS and JIG BORERS, SHAPERS and GRINDERS

Speed Up Grinding Production



MEYERS "DIA-BRASIVE" RADIUS-ANGLE FORMER

simply and quickly mounted.

k Speedy, precise and economical iorming of grinding wheels—from any angle—is now possible with this precision tool. Difficult radial and angular outlines are quickly formed. Engineered to perform with absolute precision. Vertical and straight diamond dresser nibs furnished as standard equipment. Write or wire for literature and prices.

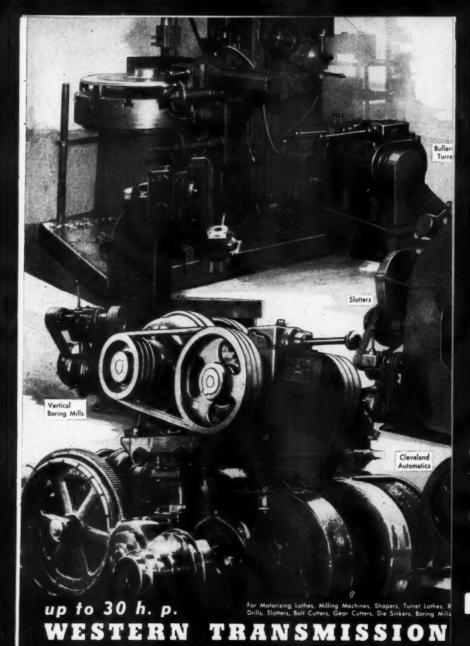


Multiple Diamond Point Dressers

Efficient—economical. Small stones cost less, and remain sharp longer. Numerous sharp points are always exposed to work, or face of wheel. New points secured by turning dresser a quarter half turn. Special dressers made to order.

Aggressive manufacturers' representatives wanted in South, East and West.

W. F. MEYERS COMPANY, Inc., Dept. BB, Bedford, Ind.



Tool Conservation begins in the Tool Crib

A PLACE FOR EVERY TOOL..

In the conservation of tools, their proper care in the tool crib is just as important as their proper use. Tools misplaced, lost or damaged through poor housekeeping methods are out of production just as completely as those worn out or broken on the machine.



Note the enterprinting assis and serius focating discs, and drawer number Corresponding symbols on the requisition, copied from a card index, enable even new employees to lucute unfamiliar tools quickly.

rda Courtery Prett A Whitney Aircraft Corn

and EVERY TOOL
IN ITS PLACE

Increased production schedules mean more calls at your tool crib windows with a probability of more delays in handling "Window Traffic". Systematic layout of aisles, shelves, drawers and compartments will assure that every tool is where you want it when you want it.

GREENFIELD TAPAND DIE CORPORATION

GRENFIELD, MABSACHUSETTS
DESIMANT FLANT SIGNS INSIGHT MUSICIAN
MARENOUNES IN New York, Chicago and La
Angeles
In Canada: Grenovield Tap a Die Corp. or Canada

<u>∕©</u>T∕© GREENFIELD

Photo Gearlesy American Boach Co.



lill set to keep going-

Even the best of Tomahawks require sharpening once in a while. When you've got a job requiring a rotary form tool and you want to keep that job going with the minimum of down time, it is not a bad idea to use, when possible, multiplegashed carbide tipped forming tools like the "TOMAHAWK" tool above.

When one carbide cutting edge is dulled, a sharp cutting edge is restored by simply rotating the tool slightly. This type of construction is particularly effective in tools which are relieved (backed-off) to provide cutting clearance.*

With multiple tipped single point carbide tools like this you can frequently eliminate as much as 90 per cent of your machine down-time for tool changes; you can cut the number of tools you have to carry in stock to keep the job running; you can save grinding time; and you can increase production per machine-hour.

*Genesee Tool Company is one of the few tool manufacturers in the United States with a completely equipped back-off grinding department.

Write for "streamlined" condensed catalog of Genesee tools, Ask for catalog No. GT-42H.

GENESEE TOOL COMPANY

FENTON, MICHIGAN



THE MOST FOR YOUR MONEY



HERE'S PERFORMANCE YOU CAN RELY ON!

Write today for literature about Marshalltown Presses — available in capacities from 5 to 70 tons.

NO. 5 FLYWHEEL TYPE

MARSHALLTOWN PRESSES BETTER PRODUCTION

Marshalltown Presses are engineered and built to give the utmost in dependable, trouble-free service. More die space — chrome molybdenum cranks, wrist pin connections and many other proven advantages. Available in capacity of 5 to 70 tons — each one an outstanding value.

MARSHALLTOWN MFG. CO. 900 NEVADA STREET MARSHALLTOWN, IOWA



drilled-not just cored. T-I engineering and experienced workmanship assure maximum power movement...long dependability. Write for latest catalogs on T-J Cylinders. The Tomkins-JohnsonCo., Jackson, Mich.

one for 1500 lbs. p.s.i. In Cushioned and Non-Cushioned types.

AIR CYLINDERS. In all standard sizes and in seven standard styles. Cushioned and Non-Cushioned types.

FOR TOUGH JOBS ... SPECIFY (T-J

TOMKINS-JOHN

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS



GARDNER-GRINDING definitely cuts costs on parallel-surface parts like thesel

TAKE a "tip" from the bearing industry, in which practically EVERY plant operates from one, to a battery, of Gardner PRECISION Double Grinders like the one illustrated here.

There are good reasons why this important industry has reduced its manufacturing costs on bearing rolls and races, thru GARDNER-GRINDING. Here they are:

- TWO surfaces are ground at ONE setting, as compared to the single-surfacing operation formerly employed.
- HIGH PRODUCTION the 30" machine shown here, turns out huge 111/4" diameter races at 75 per hour complete in 3 cuts; other Gardner Grinders handle rollers at from 30 to 100 PER MINUTE, depending upon size.
- CLOSE ACCURACIES rollers are ground within a few "tenths" — true PRECISION Disc Grinding.

Write for data on GARDNER PRECISION GRINDING!

On this No. 848-30" Gardner Grinder, 111/4" diameter bearing races are ground at 75 per how, complete in 3 cuts. TOLERANCES: ".001" -.0015" for parallelism and ±.002" for uniformity.

Average-sized 4" diameter races are handled at 40 per minute, holding to .0003" to .0005" for parallelism.

GARDNER-GRIND YOUR Flat SURFACES

GARDNER MACHINE COMPANY

436 East Gardner Street . . . Beloit, Wisconsin, U.S.A.

NOPAK 3- and 4-Way Operating Valves to actuate single or double acting cylinders. Available in all standard sizes. For air or hydraulic service.



NOPAK Shut-off Valves for fast, easy finger-touch operation: quick or throttling action. 1/4 turn opens or closes valve.

Conserve VITAL Air Power!

Don't let leaky air lines rob your compressors of their full rated capacity, or air powered tools of their top efficiency. Defective valves are a common source of air leaks, pressure loss. Replace leaky Shut-Off or Operating Valves with genuine NOPAKS. They're leakproof and wearproof, have no packing to wear out or replace. The perfectly lapped seal, between the patented coreddisc and the seat, actually improves with use — is constantly shielded from grit abrasion.

Specify NOPAK Valves to check pressure loss, to gain the full rated capacity of your compressors, reduce air costs.

GALLAND-HENNING MANUFACTURING CO.

NOPAK

VALVES and CYLINDERS

DESIGNED for AIR or HYDRAULIC SERVICE



Write for Bulletins

NOPAK Valves—Hand, Foot or Solenoid operated — are described and illustrated in Bulletin 86: NOPAK Cylinders in Bulletin 82A. Both belong in your files.

Representatives in Principal Cities



In the maintenance shops of the Grand Trunk Railroad at Battle Creek, Michigan, a Type HD-247218-A Box Furnace, as shown, is used for the critical drawing of engine springs and other parts. Other Hevi Duty furnaces are used for carburizing, hardening and subsequent heat treating. The flexibility and accuracy of these furnaces have done much to keep rolling stock maintenance at a low cost.

SEND FOR BULLETINS HD 341 and 441

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVILDUTY ELECTRIC EXCLUSIVELY
MILWAUREE, WISCONSIN

W FITCHBURG GRINDER NEW AUTOMATIC PRECISION "TYPE B" PLAIN CYLINDRICAL GRINDER

Fitchburg announces another new grinderthe Fitchburg "Type B" automatic precision Plain Cylindrical Grinder. Into this new "Type B" are built all the essentials of rigid construction for accurate work and fine finish.

This new Fitchburg "Type B" Grinder is equipped with a Standard Bowgage Wheelhead unit with complete automatic cycle-rapid traverse to work, correct feed, grinding dwell and rapid return. This grinder is of modern design, with all mechanisms readily accessible

and ease of operation is assured by "finger tip" controls.

In every detail it fills a definite need for a plain grinder where a machine is wanted for general plain cylindrical grinding, in large or small lots, with assurance of accuracy and fine finish at low cost.

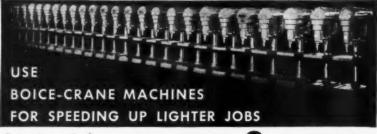
Write today for complete details and information about machines with 10", 18", 48" and 72" capacity.



NEW FITCHBURG "TYPE B"~10 is FLAIN CYLINDRICAL GRINDER



Manufacturers of — Bowgage Wheelhead Units, Multiple Precision Grinding Units, Spline Grinders, Cylindrical Grinders, Gear Grinders, Bath Full Universal Grinders and Special Purpose Grinders.



Write Today FOR THESE 2 FOLDERS ON THIS DELIVERABLE PLANT EQUIPMENT



Dependable delivery on Boice-Crane tools—often only a matter of days—never over a few weeks. Why wait 6 to 12 long months for big, heavy, costly tools that never can handle light jobs as efficiently anyway? Oughtn't you get our literature too and start tooling more light drilling, tapping, and cutting jobs this quicker, cheaper way?

Folder No. 1 lists over 60 Boice-Crane Drill Presses to 1/4" and Tappers to 1/4" capacity. No. 2 covers our 8-speed All-Purpose 14" Band Saw.

They Tell You How To Keep Your Big Machines Free For Big Work



The most logical thing in today's forced production is to use your large, hard-to-replace machines on large operations only. Load the smaller jobs on lighter, speedier, less costly and easier-to-get Boice-Cranes, and the benefits double up. Get more out of your big machine—and the EXTRA saving of running the lighter jobs at reduced cost on a machine designed especially for that class of work.

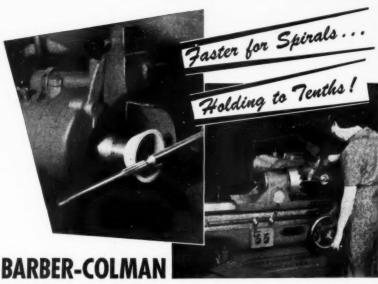
The Boice-Crane 8-Speed Band Saw Cuts Everything

The new Boice-Crane is the perfect 14° band saw for production, tools, dies, foundry and experimental work. 8 speeds cut many materials. Powerful gear drive.

Write Today-FOR FOLDERS AND CATALOG



BOICE-CRANE COMPANY TOLEDO, OHIO



Combination Sharpening Machine

The Barber-Colman Combination Sharpening Machine has a number of features which make these results possible. The wheel spindle is mounted in special compensating bearings which render it "dead" for end

spindle is mounted in special compensating bearings which render it "dead" for end play at 5000 r.p.m. Precision sine bar control of the work driving head insures accurate spiral lead. Index, operated manually, is governed by a precision latching device and can be set for regular or irregular spacing. Special form cams provide means for obtaining uniform point,

nose form, and back taper on reamers or other tools. Setups for a wide variety of work are easily accomplished on this extremely versatile machine. For further information, write for Bulletin F-1486 or see B-C representative.

DOES WONDERS WITH CARBIDE!

verything we could ask for is the way one manufacturer special iring in cemented carbide tipped tools describes the Barber-Colman Combination Sharpening Machine used in finishing precision counterbores, reamers, drills, and other small tools. They go on to say, "We are able to leave necessary lands or sharpen to edges as prints specify, bolding within tenths. The Barber-Colman method ... is much faster, especially where spirals are concerned, as well as being more accurate." (The pic-

tures above were taken in this shop.)

Bay SAVINGS Bonds SHARPEN CUTTERS PROPERLY FOR LONG LIFE

B-C

MOST, NOSTING MACHINEL, NOS INASPINING MA-CHINEL REAMES! REAMES INASP-ENING MACHINES MILLING COTTES!

Barber - Colman Company
GENERAL OFFICES AND PLANT - 207 LOOMIS STREET - ROCKFORD, ILLINOIS, U.S.A.

- COURT OF THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.



CHECK THESE ADVANTAGES OF BLANCHARD RINGING

- ★ Production
 Adaptability
- * Fixture Saving

Operation Saving

Material Saving

Fine Finish

Flatness

* Close Limits



valuable on jobs like the one illustrated.

"PUT IT ON THE BLANCHARD"



THESE cylinder bushings, 3½ inches high by 3½ inches in diameter, are of extremely thin section, yet they are held securely on the Blanchard No. 18 magnetic chick. These bushings are Gunite castings. .006" of stock is ground off both ends to limits of ± .0005" for size, and .0005" for parallelism. 50 pieces (100 surfaces) are ground per hour.

Multiple chucking and grinding on the Blanchard is the sure and economical way to machine parallel surfaces on parts such as these, also on collars, gear blanks, and washers.

The Blanchard Magnetic Chuck is so adaptable to holding a wide variety of work that it takes the place of many expensive fixtures that would be necessary on other types of machines.

The BLANCHARD MACHINE COMPANY 44 STATE STREET, CAMBRIDGE, MASS.

Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.



Save the Scrap-but better still

Costly scrap making takes a vacation when Bakewell Tapping Machines go to work! Screw threads are swiftly tapped in any material to the close tolerances of Class 3 or 4 fits—without lead error. Rejects are eliminated.

ELECTRIC FINGERS GOVERN TAPS

The exclusive feed control assures this extreme acuracy with one pass. Electrically actuated brass fingers, hobbed with the same precision threads as the tap, precisely engage the lead screw and direct the tap in exact alignment.

DEPTH IS CONTROLLED TO .005"

Another Bakewell individuality that furthers the elimination of costly scrap is the patented limit switch. A mere adjustment and the tap stroke is regulated to within a .005" accuracy.

YIELDABLE CLUTCH SAVES TAPS

Tap life is prolonged also—as much as 300%!
The patented sensitive clutch releases immediately the tap hits an obstacle. The tap halts right now! Breakage is prevented.

These and other features have put the Bakewell Tapping Machine into the front line of the manufacturing battle. They can speed your war production, save your material, gain the specified accuracy you need.

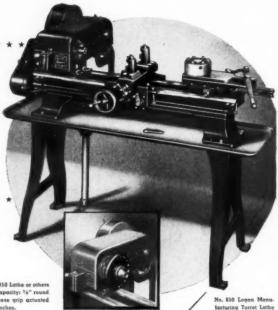
Illustrated: The Bakewell No. 1-capacities 8-32 to 3/4" in steels. Also: 1R-Radial for large pieces of work; No. 2-capacities 3/4" to 1½"; No. 0 for 0-80 to 8-32. Mention model when writing.

BAKEWELL MANUFACTURING CO.

2023 SANTA FE AVENUE LOS ANGELES, CALIFORNIA

The Bakewell is the only machine that cuts taper pipe threads to a Class 3 or Class 4 fit without leaving any cutting marks. Prompt
Deliveries
*
Send for
Cataloa

- . Swing Over Bed. 10"
- Bed Length, 43 % Spindle Hole, 25/32" Capacity, %
- Pre-Loaded Precision Ball Bearing Spindle Mounting
- 12 Spindle Speeds. 30 to 1450 R.P.M.
- Cross Slide Stroke, 31/4" · Six-Position, Automatic
- Indexing Turret . Stroke of Turret, 41/4"
- Precision Ground Ways: 2 Prismatic V-Ways and 2 Flat Ways



Logan Speed Collet Chuck for the No. 850 Lathe or others with a 112" x 8-thread spindle nose. Capacity: 5s" round bar stock. Quick acting. Positive squeeze grip actuated by plastic hand whee. No keys or wrenches.

AN ACCURATE TURRET LATHE for SMALL PARTS PRODUCTION

Developed to meet war industry's urgent need for a fine tool capable of continuous production with sustained accuracy, the No. 850 Logan Turrey Lathe has surpassed all expectations, Within the limits of its capacity (%" round bar stock) it will turn out parts with the same precision, and with equal or greater speed as that of heavier equipment, which can be released for larger work. And, of course the investment and operating costs are proportionate to its size. Complete description and specifications on request.

LOGAN ENGINEERING COMPANY . Chicago, Illinois



A NAME TO REMEMBER WHEN YOU THINK OF LATHES

IMPORTANT NOTICE

REASONABLE DELIVERY

on standard models of catalog dimensions. Write us TODAY.

CONWAY CLUTCHES

EVERY type required to conduct maximum power-flow with minimum cost of installation and maintenance. CONWAY CLUTCHES are really trouble-free... just install... that's all.

Illustrated:

XYZ-L INBOARD SHEAVE CLUTCH

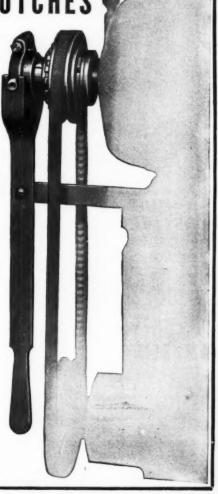
for restricted swing radii; for fractional horsepower motor shaft or oil engines.

> full floating plates; high ratio leverage; easy engagement; instant release; drag-free idling; quick mounting.

PATENTEDINU.S.A. & CANADA

CONWAY
CLUTCH CO.

1541 Queen City Ave. CINCINNATI, OHIO





SIMMONS NO. 2 TURRET LATHES are coming off the production line in ever-increasing numbers. And, just as rapidly, they are going into important plants throughout America and Great Britain. Many have reordered after observing their high-precision performance. For example, Fairchild Aircraft Limited started with a battery of eight. Today no less than twenty are being employed on the Bolingbroke Bomber!

1¼" Bar Capacity—14" Swing. Made in Plain and Back-Geared Types. A range of 1000 spindle speed is available instantly through the Micro-Speed Drive. Timken Tapered Bearings. Spindle brake. Write today for new Illustrated brochure.



SIMMONS MACHINE TOOL CORP.

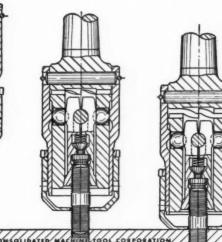
1725 NORTH BROADWAY, ALBANY, NEW YORK

SPEED-UP YOUR STUD SETTING WITH

MODERN SELF-OPENING STUD SETTERS

The 3 steps in setting studs with a Modern Self-Opening Stud Setter are: At left, Jaws open to take stud; middle, driving position, jaws locked on Stud, At right, Stud driven to full depth, stop collar contacts work. releases clutch and the act of lifting tool opens jaws. Quick—Simple—Positive.

Send for Bulletin 185-A.

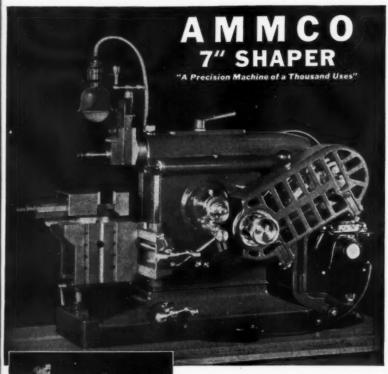


COMPONITION NACHINI 1001 CONPONITION

MODERN TOOL WORKS

DIVISION

ROCHESTER NEW YORK



IT'S PORTABLE

-- Saves Steps and Time --

Don't tie up a big shaper when so many jobs can be done just as accurately and much quicker and more economically on the AMMCO 7° PRECISION SHAPER.

Available for stationary installation or mounted on portable cabinet easily rolled to the mechanic's workbench...Write today for specifications and prices.

AUTOMOTIVE MAINTENANCE MACHINERY CO. 2106 Commonwealth Avenue North Chicago, Ill.



OF HIGH SPEED TOOL STEEL

Made in Rough, Coarse, Fine or Smooth Cut

Hand made to solve your individual problem, and suitable for the most delicate or heaviest work.

SPECIAL SHAPES & SIZES TO ORDER

Prompt deliveries

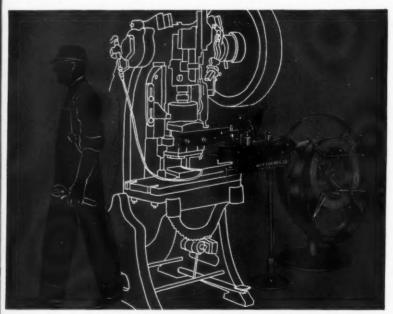
Send for illustrated catalog & price list

GRAHAM ROTARY FILE & TOOL CO.

387 FOURTH AVE. DEPT. M.T. NEW YORK, N.Y.

WAR PRODUCTION rolls out faster with

WITTEK Automatic ROLL FEEDS AND REEL STANDS



The major problem confronting industry today is increased war production. Manufacturers of metal stampings must recognize automatic feeding of coiled strip stock to punch presses as vital to the solution of their problem. Wittek Automatic Roll Feeds and Reel Stands are designed and built by engineers with years of experience to guide them. With Wittek you can conserve man-hours and maintain new high production schedules.

* Write for Descriptive Catalog

WITTEK MANUFACTURING CO., 4305-15 W. 24th Pl., Chicago, III.

KKW HYDRAULIC ARBOR PRESSES



Engineered for War Production

> Illustration below shows a special extra high 75-ton KRW Hydraulic Arbor Press in comparison with the standard 25-

ton unit.

With standard KRW Hydraulic Arbor Presses as a work-proven basis, we have been able to speedily design and build many special presses for war production—without time-consuming engineering delays. The net result has been a greatly accelerated production of vital equipment which is helping to speed the day of Victory.

As an example: The large illustration shows a special, 4-man operated, air-oil press which is used extensively for bomb loading. Hundreds of these units are now in operation.

KRW also builds standard Hydraulic Arbor Presses in 25, 50 and 75-ton capacities in addition to bench-type Arbor Presses in 1/2, 1 and 3 ton capacities. If you have a problem that an arbor press might solve, talk to us. The facts concerning many successfully-solved production applications are available in our files.

K. R. WILSON





With Both POWER and HAND FEED

One easy move of lever gives operator the choice of either hand or power feed, and neither one is dependent on the other . . . this permits top speed power grinding for diameter, and an instant switch-over to hand operation for close decimal depth grinding when desired . . . finishes the job with one set-up in place of two.

Send for "Bulletin MH2"; gives complete specifications.





feed disengaged.

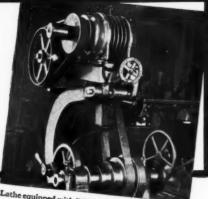


Lever pulled out: power feed is now engaged and hand feed disengaged.

ANY SPEED

not just

AT THE TURN OF A HANDWHEEL



Lathe equipped with REEVES Machine Tool Drive, utilizing the REEVES Vari-Speed Motor Pulley



New, Bracket-Mounted, Motorized, Easily-Applied REEVES Machine Tool Drive Provides

"Full Range" Speed Adjustability

Infinite, accurate speed adjustability is now available for more
machine tools. The new Reeves
Machine Tool Drive enables the
operator to secure exactly the
best speed for any size, type
and diameter of material in work
—at turn of a handwheel, while
machine is running. Widens work
range. Releases full capacities of
men and machines. Send for full
details in Bulletin MT-421.

UTILIZES EITHER OF THESE REEVES UNITS



VARI-SPEED MOTOR PULLEY with countershaft. Hand-wheel control moves motor on sliding base to vary speeds. Fractional to 7½ h.p. within 3:1 speed ratios.



MOTODRIVE—combines constant speed motor, variable speed drive and gear reducer, if needed, in one compact unit. To 10 h.p.; speed ratios 2:1 through 6:1.

REEVES PULLEY COMPANY, Columbus, Indiana

REEVES

 Compact assembly of constant speed motor, variable speed unit and mounting bracket for attaching to most machine tools by four cap screws.

MACHINE TOOL DRIVE

GREAT LAKES BROACH & GAGE COMPANY

(formerly Vickers Broach & Gage Company) 1009-15 FRANKLIN STREET DETROIT, MICHIGAN ************************

SNAP GAGES, FIXTURE GAGES, PLUG GAGES, TAPERED PLUG AND RING GAGES, HOLE LOCATION GAGES, SCISSOR GAGES AND FLUSH PIN GAGES.... SECTIONAL FORM BROACHES, SERRATON, SPLINE AND INVOLUTE BROACHES, GAGES AND ARBORS.

X-Ray Inc., our new associate company specializing in Metallurgical Radiography, now also under operation.

BEHIND OUR BOYS FOR VICTORY

HERE'S AMERICA'S NEWEST WEAPON IN THE BATTLE OF PRODUCTION!

NEW!

MODEL SKILDRILL
1147"

HEAVY DUTY
1/4 IN. DRILL
\$36

Here's the tool you need for fastest, most accurate ¼ in. drilling in constant 3-shift production. Like the famous Model "45" SKILDRILL, it's small, compact, light for easiest handling—but it has even greater power for toughest jobs . . . greater drilling speed under load for more output per man!

Compact die-cast body, helical-cut gears and 100% anti-friction bearing construction assure smoother, easier operation. Extra-Powerful Universal Motor provides peak drilling speed up to ½ in. in steel, ½ in. in wood. Available in 4 speeds (1800, 2500, 3500 and 5000 R.P.M.). Weighs only 3½ lbs.; only 7½ in. long and 2½ in. wide. Ask your distributor to demonstrate how NEW Model "47" SKILDRILL will boost your production!

SKILSAW, INC., 5035 Elston Ave., Chicago

New York - Boston - Buffalo - Philadelphia - Cleveland - Detroit Indianapolis - St. Louis - Kansas City - Atlanta - Hew Orleans Dalks - Los Angeles - Dakland - Portland - Seattle - Toronto, Can.

SKILSAW PORTABLE TOOLS

* MAKE AMERICA'S HANDS MORE PRODUCTIVE *

HERE'S THE FAMOUS MODEL"45" SKILDRILL

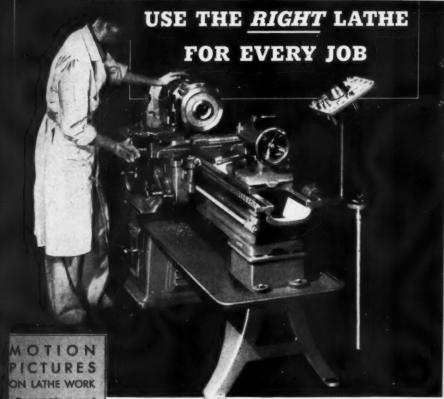
Jeatured In This Issue

EXTENDING TOOL LIFE explains the advantages derived from higher finish of tool cutting edges. See page105 SOLVING SOME TOUGH PROBLEMS is a brief description of some conversion tooling from autos to war materiel. See page121 PRODUCTION PLANNING is the theme of Edwin Mottershead's seventh Foremen's Forum contribution133 THE "PAPER DOLL" TECHNIQUE explains an effective method used by G-E in conserving sheet metal. See THE "SPLIT-SHIFT" PLAN presents one effective answer to the man-power problem. Story starts on page169 RUBBER STAMPS SAVE TIME in Lindberg's Drafting Department, as explained by Chief Engineer Kenniker

LEAD BASE BEARING TESTS offers some interesting information on this topic on page199 STANDARD TURRET LATHE TOOL-ING emphasizes the important place held by this versatile tool, on page..203 TAPPING HOLES ECONOMICALLY offers some constructive suggestions and interesting comments, on page..213 TOOLS AND DIES TO GUN MOUNTS describes an interesting conversion job, on page THE MILWAUKEE EXHIBITION tells some of the things in store at the forthcoming ASTE Show, on page....227 LET'S TALK SHOP is the Shop Notes Section, starting on page233 NEW TOOLS AND EQUIPMENT Section commencing on page254 MECHANICS THRU THE AGES ... 380



FOR SMITH MASTER SURFACE PLATES SEE OUR AD ON PAGE



Two new 16 mm sound films in full color are available on a free loan basic for lathe apprentice training in the war production industries.

Professionally filmed in our own factory under the direct supervision of competent lathe operators, these motion pictures clearly show the basic principles of engine lathe operation.

Showing time for each film is approximately 20 minutes. Write today for complete information. Time, material and manpower can be saved for vital work if you use the *right* lathe for every job. The matching of the job and the lathe has never been more important than today—in no other way can maximum production be obtained. There is no place in our war production effort for slow, obsolete machine tools of questionable accuracy.

This is proved every day in hun-

dreds of war plants where competent engineers have matched jobs with South Bend Lathes. Their speed, accuracy and ease of operation increase output, hold close tolerances, and conserve manpower and material for more efficient production.

There are South Bend Engine Lathes, Toolroom Lathes and Turret Lathes for a wide range of work. Write for a copy of catalog 100-B.



SOUTH BEND LATHE WORK

SOUTH BEND, INDIANA

LATHE BUILDERS FOR SE YEARS

As The Editor Sees It



WHEN jobs were fewer and pay envelopes more anemic, absenteeism averaged two or three percent. Workers did less loafing because they needed the money . . . and there was more danger of being fired.

Now when we're facing an acute man-power shortage . . . when we're fighting for survival of our way of life, absenteeism has in cases soared to the alarming figure of 15 percent. It adds up to millions of man-hours lost forever. On the fighting fronts, lives will be lost because too little will arrive too late.

What is the remedy? One answer is a patriotic appeal, endeavoring to awaken appreciation of the workers' part in helping to win the war. In some cases, absentees are interviewed by counselors on their return to the jobs. In other instances, time cards are removed and the worker is required, upon his return, to report to his foreman or other plant official. Attendance contests have helped elsewhere, posting attendance rates for plant groups, with special awards to departments and individuals for good attendance records.

There is a real opportunity for intelligent union leadership in helping to keep men on the jobs . . . until final victory has been achieved.

Wesley G. Paulson

Reporting on Current Steel Stocks

As you may know, the steel warehouse industry entered the war period with large and complete stocks. These reserve stocks of steel enabled industry to switch over quickly from peace to war production. However, in the process, stocks of steel in the warehouses of the country became seriously depleted. In fact, these great sources of emergency steel became almost non-existent.

No matter how carefully plants are maintained and production programs scheduled, there are always times, particularly under our heavy war load, that certain lots of steel must be secured immediately or production is imperiled. So companies working at top speed and embarrassed by their inability to secure steel quickly from warehouses, began reporting their problems. The War Production Board was quick to grasp the situation and assign special allotments to the warehouses. A bad situation is now gradually being improved and we are glad to report that our stocks are somewhat better assorted.

In order to eliminate the time required for many roll changes and so to permit increased overall production of steel, we are concentrating on the most generally used sizes. In spite of this curtailment of our usually very broad range of sizes we are now better able to serve than at any time in recent months.

When you need steel or have a problem of selection or fabrication, get in touch with your nearest Ryerson Steel-Service Plant. Our engineers and metallurgists will be glad to work with you. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON

Extending Tool Life

By R. A. REED

TODAY, with high speed tool steels high on the list of critical materials, it is vitally important to lengthen the life of every cutting tool as much as possible. As a result, many metal working plants are finding it advantageous to go to high surface finishing when regrinding their cutting tools. Not only does this greatly increase tool life but also productivity.

Luckily, much of the experimental work on this method of tool finishing, including the development of suitable grinding wheels, had been done before we were actually in the war. The present shortage of tool steels, however, has naturally increased interest in the subject and led to still further development work by abrasive engineers and tool engineers.

It has long been an admitted fact

that the keener the edge of a cutting tool, the better work it will produce, with increased tool life due to the longer intervals between sharpenings. However, there had always been an impression that the increased cost in producing a higher surface finish on cutters would offset the benefits to be derived. This impression no doubt resulted from attempts in the past with long, costly procedures that served only to discourage further attempts.

But experimental work in the plant of a large manufacturer of textile machinery showed that refined surface finish could be applied economically to cutting tools, and with startling increases in tool life. The experimental work started when the tool engineer of this company became dissatisfied with their tool costs—even tho they were using the best tools available on modern machines and at the

Fig. 1 (Center) Splining Cutter. Fig. 2 (Left) Photomicrograph of cutting edge (indicated by arrow in Fig. 1) as commonly reground. Fig. 3(Right) Photomicrograph of same cutter after high surface finishing. Leveling off of hills and valleys gives a keen, long-lasting cutting edge. Magnification is 100X.

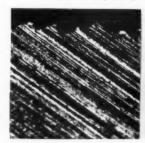








Fig. 4 (Center) Typical 2½x%" End Mill. Fig. 5 (Above) Cutting edge of End Mill shown in Fig. 4, as commonly reground. Fig. 6 (Below) Cutting edge of End Mill (Fig. 4) when high surface finished. (Magnification 100X).

recommended speeds and feeds. As a result, abrasive engineers were asked to check the grinding operations for possible changes in wheel specifications which might give better grinding performance and thereby better tool performance.

For sharpening various milling cutters, for example, they were using an aluminum oxide wheel, 46 grit and K

grade or hardness. To improve performance, the grit size was changed to 60 and a different type of vitrified bond was employed (3860-KSBE). The result was very satisfactory. The finer wheel produced a much keener edge with much less wheel wear, due mainly to the fact that this wheel required less dressing. Comparison under a magnifying glass of the cutting edges produced by these two wheels revealed to a far greater extent the improvement that had been made. In fact, the comparison was so interesting that the next step was to make a careful analysis as to just what the cutting tool was and what its edge should be and how it

As a result these questions developed:

1-What is a cutting tool?

Very simple—it is an instrument that has one or more sharp edges used for removing surplus material.

2-Why does it wear out?

Because the cutting edges break down, become dull and fail to cut off the surplus material as quickly and smoothly as modern methods demand, thus requiring regrinding to renew its original effectiveness.

3-Why does it became dull?

Because for some reason, the cutting edge becomes defective and cannot do the work demanded of it. It is no longer a good edge.

4-What is a good cutting edge?

A good edge should be an unbroken line at the junction of two planes, usually forming an acute angle.

5—Why must the line be unbroken? To equalize the load placed upon the edge.

With all of these theories in mind, a visual inspection of various tools was started, examining both used and new tools, with inconclusive results. Resort was then had to the microscope and it revealed that which the eye had failed to see. Illustrations and photomicrographs, Figures 2, 3, 5 and 6, at 100 magnifications demonstrate clearly the results of this study.

Figures 7, 8 and 9 are artists's sketches which illustrate graphically, the facts discovered by the photomicrographs. Note the hills and valleys running into each other, not hill to hill and valley to valley, but haphazardly, causing ragged broken lines of peaks and valleys. It is quite obvious what takes place when the cutter is put in The unsupported peaks are unequal to the heavy load imposed upon them and quickly break off leaving flat spots that rub instead of cut. places a greater load on the remaining edge, which in turn fails more quickly than it would if the edge were straight and the load equally distributed. In the meantime, these flat spots continue to abrade, tearing the stock off instead of giving a smooth clean cut. At the same time, heat is generated thru this friction, which eventually affects the entire cutting edge and naturally the hardness of the cutter. Net result—a dull tool.

Figure 9 shows the type of edge produced by fine surface finish. The load is distributed evenly over the entire cutting edge. It stays sharp longer and turns out better work.

The next step was to devise an economical method of removing the hills and valleys, approaching as nearly as possible the straight unbroken line shown in Figure 9. To perform this

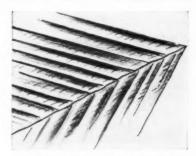


Fig. 9—The elimination of peaks by finishing with fine grit wheels results in a sharp, straight cutting edge that stays sharp longer because the load is evenly distributed.



Fig. 7 (Above) A cutting edge as ordinarily reground would show hills and vaileys like these, under high magnification. Fig. 8 (Below) Note how the peaks, unequal to the heavy loads, break off, quickly dulling the cutting edge.

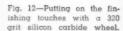
operation, a fine grit silicon carbide shellac bonded wheel (37320-J8L) was used with considerable success on the tool and cutter grinders, surface grinders, etc. The three pictures (Figs. 10, 11 and 12) show how easily this work and change of wheels is accomplished on the tool and cutter machines when grinding an inserted tooth cutter:

Fig. 10—The first step is to regrind as usual, with a 60 grit wheel, leaving about .001" for the fine finishing wheel.

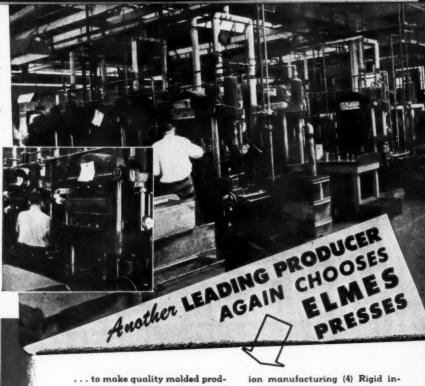




Fig. 11—Changing wheels for the finish grind requires only a minute's work.







... to make quality molded products faster. This installation of Elmes Hydraulic Presses began in a small way; repeat orders have expanded it into this large battery.

This example is typical of many manufacturers who have regularly reordered Elmes Presses, based on performance. The success of Elmes Presses is due to: (1) Long Experience (2) Proper design (3) Precision manufacturing (4) Rigid inspection and (5) Conscientious service to customers. Elmes builds metal working presses, plastic molding presses, extrusion presses, pumps, accumulators, valves and accessories.

Elmes engineers will cheerfully study your hydraulic power problems and make suggestions. Why not write them today?



CHARLES F. ELMES ENGINEERING WORKS
OF AMERICAN STEEL FOUNDRIES

244 NORTH MORGAN STREET . CHICAGO, ILLE



Figures 13 and 14, showing a typical inserted tooth cutter as ordinarily reground—and as reground with high surface finish for increased production and longer life.

A—First it is ground in the usual way with the 60 grit aluminum oxide wheel. Then this wheel is quickly replaced with the 320 silicon carbide wheel and the high surface finish is obtained. The same method is used for all milling cutters.

B—Gear cutters are ground first in lots—then the wheel is changed and the lot given the high surface finish.

C — Dies, punches, broaches are ground and given high surface finish in position by changing the wheels:



Fig. 17—Ordinary regrinding (left) and with high surface finish added (right).



Fig. 15—Ordinary regrinding job is shown at the left—and a corresponding high surface finish job is presented at the right.



Fig. 16—Gear cutter as ordinarily reground at the left—and with high surface finish at the right.

Let's win this battle, too!



** Hand tools are taking a terrific beating in the war factories. WPB estimates that because of improper use, the life of 75% of such implements is greatly reduced. Wear and tear appears to be greater on second and third shifts made up of less experienced workers. ***

AMERICA! . . . Where ships are built in a fortnight! Where planes, guns and machines are produced by the thousands! Where manufacturing efficiencies are the wonder of the industrial world!

It is not at all like the American way to permit wastes like those reported in Newsweek. Even under the stress of war production, tool misuse and abuse can be greatly lessened—through education. The millions of filing operations which take place daily in factories, machine shops and other industrial plants represent a wide field for teaching, training and savings.

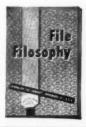
Toward aiding manpower—conserving materials—making files do more work and last longer—

THIS NEW BOOK WILL HELP

"File Filosophy," by Nicholson, is recently off the press. Send for it. It's FREE—48 instructive, profusely illustrated pages on files—their many kinds, correct use, proper care and how to select The right file for the job. "File Filosophy" will prove helpful to both men and foremen to pass valuable information along to workers eager to learn and ready to do their part in the war we must win.

Nicholson File Co., 16 Acorn St., Providence, R. I., U. S. A.

(Also Canadian Plant, Port Hope, Ont.)







NICHOLSON FILES

FOR EVERY PURPOSE



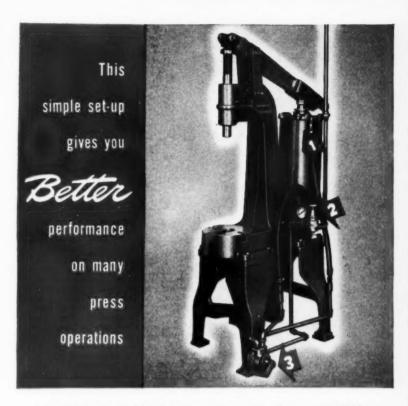
Fig. 18—(Top) Cutting edge of hand ground tool. Finish 20-25 R.M.S. Fig. 19 (Center) Cutting edge of semi-finished machine ground tool. Fig. 20 (Bottom) Cutting edge of machine ground tool with high surface finish; 1.0—1.5 RMS—Wright Aeronautical Corp., photomicrographs—100X.

Figures 13 to 17 show photomicrographs of the edge of typical cutting tools as ordinarily reground and after high surface finishing. The difference is quite apparent and demonstrates clearly why tool life will be much increased.

The usual procedure is to remove whatever stock is necessary to restore the tool to its proper shape with the aluminum oxide, 60 grit, K wheel (3860-K5BE) leaving about .001" for the fine grit silicon carbide finishing wheel (37320-J8L or 37320-H8T-4). To remove any more than .001" with this latter wheel might result in slight burning, which can be overcome by thinning the rim with an abrasive stick. As a matter of interest, one of the gear shaper cutters finished by this method was checked with a profilometer and a reading of 1.3 micro inches was obtained. It does not necessarily follow that this particular specification for a fine finishing wheel is the ultimate, but it just so happened that it fitted in with this plant's equipment. Other plants may use different methods, grains and grades but the final result is a better cutting edge and longer tool life.

Single Point Tools

Tool engineers in a large airplane motor plant felt that the use of high surface finish might work with equal success in lengthening the life of single point cutting tools. Accordingly, they conducted extensive tests and experiments using photomicrographs to substantiate them. They found that the irregular saw tooth cutting edge (Fig. 18) produces an uneven flow of metal thru the crevices which thereby creates localized high stress concentration. The result is a localized heating of the tool point which accelerates the rate of breakdown. The resistance to chip flow



• Hannifin Pneumatic Arbor Presses are being used for fast, efficient production of a great variety of press-assembly, molding, straightening, bending, forming, and similar operations involving the application of pressure. An air operated press provides uniform, adjustable pressure by means of the regulating valve, and simple, foot pedal control. Operator fatigue is avoided, and fast, uniform production can be consistently maintained.

Write for Bulletin 46 describing the complete range of types and sizes of Hannifin Arbor Presses.

HANNIFIN MANUFACTURING COMPANY

621-631 South Kolmar Avenue - Chicago, Illinois

- Model B-2 Arbor Press, equipped with Series "R" Leakproof pneumatic cylinder.
- 2 Pressure Regulating valve.
- 3 Foot Control Valve.

A hand control valve can be used if desired.

HANNIFIN Preumatic PRESSES

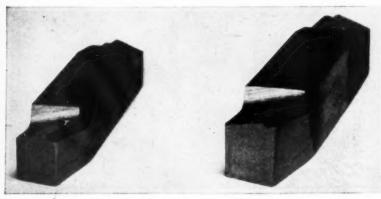


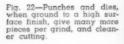
Fig. 21—Typical single point tools that have been machine ground to a high surface finish for longer life. (Wright Aeronautical Corp., photo).

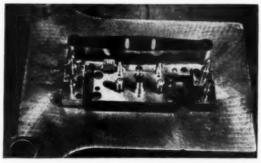
caused by roughness of the tool face aggravates this condition, creating an unstable condition in the cutting of the metal. This produces increasing amounts of built-up edge on a tool and results in a rougher machined surface.

To minimize this effect as much as possible a method of giving the cutting edge a higher surface finish was developed (Fig. 20). For this final finish, a fine grit (220) fused alumina wheel in grade L is used (38220-L9BE). The grinding is done dry and requires about one minute. The wheel is easy to use and does not burn readily. A finish of 3.0 to 3.5 micro-inches, r.m.s. is accepted as satisfactory but it is easily possible to obtain the smooth-

ness of 1.0 to 1.5 micro-in. The time for this final finishing operation was reduced by grinding the clearance angle to approximately 6½ degrees and then grinding only the upper half of the tool flange and end, a procedure that brings this portion of the clearance angle back to 6°. The wheel used for the semi-finish grinding (Fig. 19) preparatory to the high surface finishing is an aluminum oxide, 46 grit, grade L (3846-L5BE).

Chip breakers are ground with a positive rake and polished dry with a fine silicon carbide wheel (37320-J8L) to a finish of 2.0 to 2.5 micro-inches. For this part of the work, the tools are held one at a time in a magnetic uni-





Im tellin you.

USING A CHUCK

Generally speaking, a chuck is used when the piece to be machined is irregular in shape; large in diameter in proportion to its length; so long as to require its being passed through the spindle; or when it is to be bored or drilled on the lathe axis.

On many lathes more than seven years old, there is a threaded spindle which requires some special handling when you put on or take off a chuck. On today's modern lathe this thread has been replaced with a standard taper spindle nose. Here is the procedure for putting on both types.

TAPER SPINDLE NOSE

Simply place chuck on spindle nose with slot (A) fitted over key (B). This leaves both hands free to start and tighten collar (C). On or off the operation takes 12 to 15 seconds and is practically fool-proof.



OLD TYPE THREADED SPINDLE NOSE

Don't put chuck on with the lathe running. It is dangerous to the operator and bad for the thread.

Hold chuck up to nose and revolve spindle by hand until engaged, then run chuck on by hand. If the chuck is too heavy for steady handling, place on a board across wings of carriage, using the board as a lever to raise chuck in alignment with threaded nose.

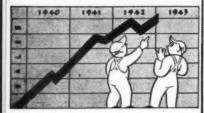
Another good practice is to put a large washer made of blotting paper between spindle shoulder and chuck plate. This may seem amateurish, but it helps to compensate for sticking threads which is one of the disadvantages of this old type nose.



Cincinnati, Obio

Largest Manufacturer of a Complete Line of Lath





UNIVERSAL GROWS BY LEAPS AND BOUNDS

Production of Universal Drill Bushings has doubled each year over the same preceding period for the last three years — proof that American manufacturers demand the best. Universal bushings have superfinished bores which assure accuracy and unexcelled wearing qualities. Write for complete facts.



versal vise on a surface grinder. Only a very small amount of stock should be removed in this operation but it is necessary that the grinding be done carefully to avoid burning.

The experiments of these engineers also showed that a very marked increase in the performance and life of single point tools could be obtained by machine grinding them in the tool room instead of having them hand ground by individual operators. This is due in a large measure, of course, to the closer control of rake and clearance angles that is possible by machine grinding and tool room supervision.

The grinding wheel specifications cited here for both the fine finishing of cutters and single point tools are the ones that have been found most satisfactory in general. Conditions are not identical in any two plants, of course, and many times some modification of these specifications may be necessary. The engineers of grinding wheel manufacturers can make a study in any plant and determine just what wheels will be best. That high surface finish will definitely increase tool life many times is a well proven fact. In many cases, increases have been several hundred per cent. Unquestionably high surface finish is well worthwhile in these times, when longer cutting tool life is so essential.

Photos—Courtesy Norton Co., Worcester, Mass. Figures 18, 19, 20 and 21 were supplied by Carl J. Wiberg of the Production Engineering Dept., Wright Aeronautical Corp.

THERMON 7" ROTARY TABLE



Precision ground top and bottom – Substantially ribbed. 4 table quadrants calibrated 0 to 90° each. Friction loaded worm dial graduated in 240 minutes. Overall height only 246", Write for folder!

MACHINERY MANUFACTURING COMPANY

Volume Line of the Contest HARTS and Contests HARTS and

Will Your "FORTRESS" Be Ready On Time?

Think of the months of training and practice this bomber crew put in before they were ready for the real test.

ALTER EGO: And, think of the years of effort engineers and shop men put in the development of the "Flying Fortress" . . . all to enable the crew to rule the airways—to navigate in a bee-line to the destination, fight off "competition" all the way, hit the target and get home safely:

Like the YEARS of preparation that'll be required to develop fortresses of knowledge before business crews can expect to rule the post-war market ways.

ALTER EGO: Right! It'll take shrewd management to steer a course of profits...ingenious designing to fight off tough competition... efficient production to hit the mark of rock-bottom costs and top quality. All of this to survive.

All of which is embodied in the practiced use of arc welding. There's our fortress for survival in the Battle for Business. Let's start developing our welding knowledge NOW by consulting Lincoln.

Ask your inner self if time isn't getting short for post-war planning

then I said to myself-

WELDED PRODUCTS HIT THE TARGET







DWARFED BY A MATCH!



A low-flying plane, aiming itself at an enemy cruiser—a lever pulled and a long, sleek torpedo drops into the water and rushes destruction toward the enemy.

But all must be right with the big tin fish!—the motor running smoothly and the fuse already for the smash into the side of the ship. Tiny mechanisms, more accurately made than any watch part, assure the success of the attack.

VINCO accuracy in the manufacture of fixed limit checking devices, is well known throughout the long list of war producers. For example, the gage at the left has proven accuracy of less than .0001 error, yet is smaller than a match stick. Parts checked with gages as accurately made as this, must operate smoothly and surely.

From a weight of an ounce to a weight of many pounds, VINCO gages all have the same VINCO accuracy.

If you have a gaging problem, VINCO can help you.

VINCO CORPORATION \$859 SCHAEFER HPGHWAY



America's women are proving that on many war-plant jobs they are more efficient than men—especially when provided with fast, accurate easily operated machine tools such as Covel Style No. 15 Hand Feed Surface Grinders and Covel Precision Vises in styles shown here. Reasons why No. 15 Surface Grinder is ideally suited to women operators are given in Bulletin MT-33—get your copy and name of nearest dealer today.

Prompt Delivery to War Industries.

Shorten employee training time with Covel equipment.



Here's a better, faster way to de-burr!

Burr removing operations with files, scrapers, and emery cloths are generally slow, tedious jobs—costly jobs. And especially so in the case of multi-walled parts where it is extremely awkward and hard to reach certain places, burring on those parts is wasteful and inefficient.

The new NOBUR TOOL eliminates burring as a bench

operation and makes burring a fast, easy machine operation. It can be handled by anyone on any machine with complete safety. All burrs are instantly removed, smoothly and accurately, and burring can be done as fast as parts can be handled by the operator.

The new NOBUR TOOL helps to release vitally needed manpower for other war work, cuts burring time to an absolute minimum, increases the production of finished parts and eliminates the waste of vital materials. It's a necessary production tool—necessary today because you are interested in saving time for war production—necessary tomorrow because you'll be interested in saving costs!

NOBUR MANUFACTURING CO. 910 North Orange Drive, Los Angeles, Calif.

> Write for FREE folder and complete information on burring this better, faster way!

NEW NOBUR TOOL MAKES BURRING A MACHINE OPERATION!

ONCE IN AND OUT...

THE BURR IS GONE

DOUBLE-QUICK

OPERATION!



Solving Some Tough Problems

By LLOYD STOUFFER

S OME notable applications of automotive manufacturing technique to the production of the complicated Pratt & Whitney airplane engines have been developed at the Ford Motor Co.

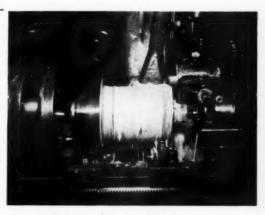
Outstanding a mong these is the use of a water-cooled arbor — a Ford - patented invention — which is reported to have reduced from 90 to 20 minutes, the grinding time of the thin - walled Pratt & Whitney engine cylinder barrels, with a considerable saving of material.

Fundamentally, an arbor is a spindle, suspended between two centers, on which revolves the metal to be ground—in this particular instance, the thin-

walled but extremely high-strength cylinder barrel. Then the usual practice on such grinding jobs has been to apply an oil soluble—a mixture of oil and water—and apply it only to the outer surface of the metal that is being ground.

But Ford found that because of the thinness of the cylinder barrel, heat from the grinding had a tendency to warp it, resulting in interrupted production and loss of valuable time and material.

With the new Ford arbor, the bar-



Ford-patented water-cooled arbor in action. Coolant is shown pouring over a cylinder barrel of. a Prait & Whitney aircraft engine as it is being ground. In addition to the water pouring over the outside of the barrel, another stream enters thru the end of one center, at left, and is discharged, at lower right, after passing thru the arbor.

rel is water-cooled both inside and out during the grinding operation, eliminating danger of warping and thereby increasing production.

In addition to other noteworthy features of the Ford device, wear on parts is reduced to a minimum. This is natural, as these moving parts, so subject to wear are bathed in a constant flow of the coolant element. This cooling medium flows from the end of one center, thru the arbor, and is discharged from the opposite center thru a small orifice. The fluid is kept at a



Component parts of the Ford patented water-cooled arbor, which may find a wide diversity of uses in peace-time manufacture. At left, the arbor itself, showing orifices thru which coolant passes to cool inside of cylinder barrel. Center rear shows cylinder barrel before the grinding operation starts, and right rear, the barrel after the 20-minute grinding. At front are shown the two centers which hold arbor in place. The small orifice at top front of center on right allows for discharge of coolant.

constant pressure of one pound per square foot.

On the same job, Ford is making effective use of a liquid-air dip for contracting the main bearing before insertion into the front power section of the crankcase. This permits a close fit on this vital part, such as could not possibly be achieved by ordinary methods. The bearing is immersed for two minutes in a container of liquid air at 75 degrees F below zero. extreme cold shrinks the metal so that it is easily dropped into place in the crankcase, and, on returning to room temperature, it expands to seal itself securely into place. The same technique is used on several other closefitting parts.

Another unusual machine tool developed by Ford for the Pratt & Whitney job, on which the company has been in mass production for over a year now, is a multiple spindle drill which simultaneously drills 32 holes in the nose piece of the engine, an operation which formerly required several machines and much more time. This machine was specially built by Natco.

One of the longest lathes in use in all American war industry is a hollow spindle gun-boring lathe with a 64-foot bed length, developed for production of 90 mm gun barrels in a plant of the Chevrolet Division of General Motors.

Liquid air at 76 degrees F below zero plays an important part in manufacture of Pratt & Whitney airplane engines at Ford Motor Co. Workman is shown dropping the main bearing into place in front power section of crankcase, after the bearing has been dipped in the liquid air container, at right, for two minutes. Expansion seals the bearing tightly into place. At left, another front power section is pictured.



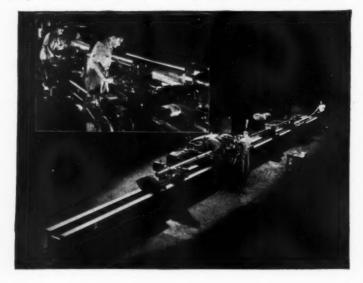


A Ford workman is shown operating a special Natco multiple spindle drill which performs, in one operation, work on the nose piece of the Pratt & Whitney airplane engine, which formerly required several machines and much more time.



This giant lathe, used to machine the gun tube, or barrel, is only one of 354 machines used in this plant for finishing the vital gun barrels, which are shipped to Chevrolet in rough-stock form by a Government arsenal.

Production of this weapon on a volume basis is only one of many armament tasks assigned to this enterprising peace-time builder of motor vehicles, but it involves some of the most spectacular machining operations.



AMES and ACCURACY ... HAND in HAND FOR 47





INDICATORS

B. C. LIMES CO., WALTHAM, MASS, U. S. A.



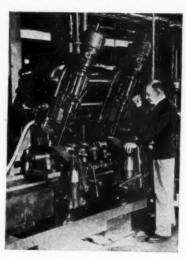
Originally conceived as an anti-air-craft weapon, the 90 mm gun has come into new prominence as an anti-tank weapon or tank destroyer, high-lighted by the success of the German 88-mm gun used in the African campaign. Capable of destructive fire at ranges above 30,000 feet, the 90-mm gun barrel is 15 feet long.

Here's American ingenuity at work. A dime-store mirror, attached to the end of his grinding machine, enables this machinist at the Pontiac Motor Division of General Motors to be in two places at once. Watching the reflection, he is able to tend the machine and at the same time observe its action on the end of the long anti-aircraft cannon barrel.

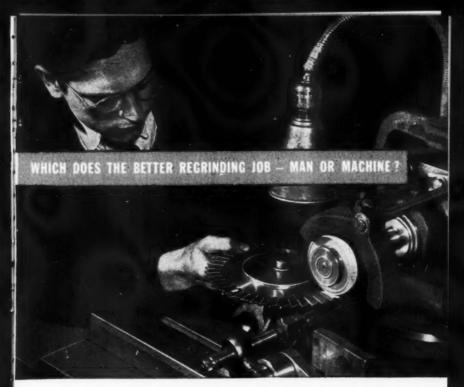
Another outstanding example of automotive ingenuity in machine tools is the development of the special purpose machine shown in an accompanying illustration by engineers at the Hudson Motor Car Co.'s main plant.

It is a device for deep hole drilling of the forced-feed lubrication oil holes thru the webs and crank pin of the big crankshaft of the Hudson Invader engine, used by the Navy to drive invasion barges.

The engine contract was received by Hudson only a few months ago, and it was a double-rush job. Because the Invader engine is far bigger in all di-



This special purpose machine at Fudson Motor Car main plant was evolved by throwing together parts of three standard-type machines—a former engine lathebed and two drill press heads. It is used for deep hole drilling of the forced-feed lubrication oil holes thru the webs and crank pin of the big crankshaft of the Hudson Invader landing-barge motors, and is outstanding among 750 similar conversions of automotive machinery for this rush job, to save time and eliminate the strain on machine tool plants.



Whether your dull cutters can be better reground by machine or by skilled craftsmen depends entirely upon the type of cutter—and the arrangement of its flutes. Here at Severance Tool we regrind thousands of cutters each day—some by machine and some by hand. Regardless of the type of tools you send us, we are manned and equipped to regrind them by the method that does the job best.

After regrinding we further improve your tools by the new Severite heat-treat process which hardens the teeth of your cutters and increases their life two to five times.

Severance Regrinding Service, 1) Saves tool steel by making worn cutters as good as new, 2) Saves your production time by returning your renewed tools within 72 hours of the time they are received and 3) Saves money because Severance regrinding costs only a fraction of original new tool price. Write today for "Regrind Toollog" describing our regrinding service.



Severance

MIDGET MILLING CUTTERS • PRECISION REGRINDING SEVERANCE TOOL INDUSTRIES, INC., SAGINAW, MICH. • PLANTS IN LONG ISLAND CITY, N.Y.; DETROIT, MICH., FORT WAYNE, IND.; CHICAGO; AND LOS ANGELES



Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 195,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

Send for our new 336 Page Catalog.

E. A. BAUMBACH MFG. CO.

1810 So. Kilbourne Ave., CHICAGO, ILL.

the job ordinarily would have called for a large number of new machine tools.

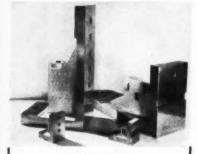
Realizing, however, that they would be unable to meet the schedule laid down for them by the Navy if they

mensions than an automobile engine.

Realizing, however, that they would be unable to meet the schedule laid down for them by the Navy if they had to wait for the construction of new machines, Hudson engineers scoured factory lofts for any possible conversions of existing equipment for the new job. In all, more than 750 machines were converted, and the flow of fully – approved Invader engines started ahead of schedule.

Typical of the conversions is the multiple drill shown, which was constructed by using the parts of three old standard-type machines—namely, a former engine lathe bed and two drill press heads—with the addition of a specially built feature.

The operation involves drilling holes at an angle from each side of the shaft, to meet at the center. Ordinarily, the conversion of existing machinery to such an exacting job would have been unthinkable, but it was done.



Angle Plates for, Boring Mills, Drills, Grinders, Layout, Inspectors. Surface and Lapping Plates. Prompt Delivery.

TATRA TOOL CO. 16317 Sanford Ave. - Cleveland, O.

HIGH Production—LOWEST Cost Lewis Bench Mill



Efficiently handles many shop assignments for beach mill work where large costly machines are unnecessary. Has ample capacity and versatility for accurate small parts production in war work.

This is only one of 21 Lewis Machine Tools available on low priority as plain or semi-finished castings. Complete blue-prints show construction and assembly details. You can finish thee tools and put them to work at 1/6th new tool cost_and a fraction of usual delivery time.



Send for new 3 2 - p a g e Lewis Catalog giving full details, It's free!

Dept. Z-26

P.O. Bex 116, Station A.

Los Angeles, California



PULLERS do the job the FIRST for sale sure separation. They time. No Delay, Use ACRO PULLERS for sale sure separation. damaged die sets caused by prying or hammering. ACRO DIE SET
PULLERS do the job the FIRST time. No Delay, Use ACKU FULLERS for sale sure separation. They war plants using these pullers report are fast—accurate—positive, savings as high as 50% in time alone.

ACRO PULLERS are indispensable for the grinding, mounting and

ACRU PULLERS are indispensable for the grinding, mounting and fitting of punches, enabling the operator to raise punch from die easily, markely and amounting the operator to raise punch from die easily, and a positively holding the set at any desired height litting of punches, enabling the operator to raise punch from die easily, quickly and smoothly, positively holding the set at any desired height. Order a set today. Convince yourself of the savings you can make

Order a set today. Convince yourself of the savings you can in your tool room. ACRO PULLERS furnished in three sizes.

now for more information.

PROMPT DELIVERY

ACRO METAL STAMPING CO.

332 E. RESERVOIR AVE.

MILWAUKEE, WIS.

AN Essential TOOL HOLDER





Willard Spring Tool Holder __ is an "essential" in our war-time machine shops and tool rooms. New in design, the "Willard" is efficient, accurate and economical — can be used for all types of threading, coarse or fine. Adaptable to a wide variety of work. The spring

feature prevents shock to the cutter — minimizes cutter breakage — makes possible faster and smoother feed with heavier cut. Economical because it eliminates chatter — damaged work is reduced to a minimum. Made

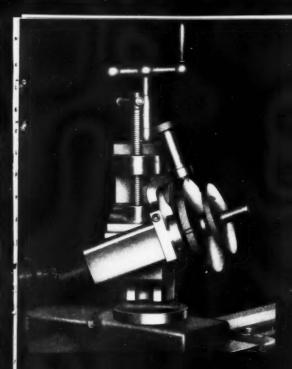
in three sizes for \(\frac{1}{a}\)" - \(\frac{1}{a}\)s" and \(\frac{1}{a}\)" square tool bits. Specify "Willard" for accuracy and economy. Write for further information.



Awareed to Auto Ordnance Corporation for excellence in production of Tomms

AUTO-ORDNANCE Corporation

THOMPSON TOOL DIVISION
342 WEST PUTNAM AVENUE, GREENWICH, CONN.



EFFICIENT

PRACTICAL

ECONOMICAL

Thempson. MILLING FIXTURE

The Thompson Universal Milling Fixture, with the 3-way circular swing, converts any standard bench lathe, easily and quickly, into an efficient, time-saving milling machine. Lends itself readily to straight or angular milling by using vise and universal slide base without index fixture. For milling punches, key ways, end mills, "C" bores, or the manufacture of duplicate parts. Write for further information.

AUTO-ORDNANCE orporation

THOMPSON TOOL DIVISION
342 WEST PUTNAM AVENUE, GREENWICH, CONN.



NATIONAL ACME

TEMP CONSIGNATION A REMOVE BUR AND CHICAING BUTTOMATICS - SINCE SPRAGLE AUTOMATICS - AUTOMATIC SUBLADING OF

The Foremanship Forum

By EDMUND MOTTERSHEAD

Part VII-Productive Planning

A FRIEND told me a story the other day. He said that a few days before, he had obtained a position with one of the war plants, in the production planning department, as stock control clerk. When he told his family about it, his 12-year old son said—"What's productive planning, Pop?"

He thought that the youngster's query might have some deeper significance, as the chance remarks of children so often do. And he said to me, "What was I to tell the kid? What does stock control or cost accounting or time-study mean to anybody his age? I had the toughest time making the whole idea of production planning clear to him; and when I got thru I wasn't at all satisfied with my own understanding of it."

I wonder how many foremen have more than a hazy notion of just what production planning really is. If they have some understanding of it, what are they doing to make it **productive plan**ning?

Planning in its broadest sense pertains to the formulation of a program for the entire organization to follow. It begins with plans of the Board of Directors, and follows down to the smallest group of workers. It considers finances of the present and future; functions of selling, engineering, cost accounting; layout of the plant, departments and equipment; routing the pathway for materials to follow in their flow thru the shop; scheduling of the times jobs are to be started and completed; following-up or dispatching work from step to step; directing of

individual production; and anticipation and meeting labor and material needs. There is one prime requirement of the individual who is to carry out this function . . . vision.

The ability to plan demands vision, the ability to see ahead, to imagine, to anticipate contingencies and prepare for There are perhaps only two qualities which make one man a worker and another man a leader and eventually an executive—the ability to handle other men, and the ability to think and plan. Thus, for the foreman who seeks further advancement, an understanding of production planning is essential. For the foreman who sincerely wants to make his department as efficient a part of the plant as possible, an understanding of the production planning of his organization is essential. And for the foreman who will advance, the ability to plan productively is essential.

There are 6 factors with which production planning is basically concerned:
—the determination of what is to be made, when it shall be made, where, by what methods, how much of it shall be made and at what cost. Thus the term "production planning" refers particularly to actual production processes of the organization.

In the typical small shop, the superintendent and a production clerk may take care of systematic outlining and control of the flow of work. In larger organizations, this work is carried out by a planning department, a methods engineering department, an engineering department, or some such. The function is basically the same, whatever name it is given.

In most shops, this function includes a combination of planning and control. It lays out the most effective pathway for work to follow in the factory, figures out ways and means of accomplishing that journey; and goes with it as its guide to see that it keeps on its proper path and gets to the jour-ney's end in good shape and on time. Such planning determines where, when, and how the work shall be produced. The planning may be a very simple process, or it may be the elaborate system found in large plants. best system is one not so simple that it is inadequate or yet not so complex that it is burdensome . . . one which requires the smallest amount of forms and detail work to get the best and most economical results.

Some of the more detailed functions of the typical production planning department would include:-advice as to the design of the product, perhaps even determining that design; providing necessary patterns and manufacturing

tooling, such as jigs and fixtures, dies and other tools; determining and specifying the kinds and amounts of raw materials, half finished materials, finished materials, machines and equipment to be purchased, selecting and discovering methods for doing the work itself; routing and scheduling the work as it goes thru the shop; setting standards of quality and quantity. It should employ whatever cost accounting or time study engineering or other skills that expedite the work and turnout the finished goods on schedule or ahead of schedule, up to standards for quality or better, at the predetermined costs or less. Stock room control, supervising the maintenance of equipment, keeping and interpreting production control records of all kinds. outlining labor requirements, selecting methods of transportation, developing the safe!y program which will aid the production effort and keep the plant layout in tune with production require-

For Checking



The straightness of these bands formed by interference of light waves reflected from the flatlapped steel surface gives a true measure of its flatness.

For COMPARISON MEASUREMENT

Acme Glass Optical Flats used in conjunction with your gage blocks make comparison measurement simple and easy. Accurate measurement in millionths can be quickly obtained with this equipment.



The Acme Monochromatic Lamp provides light of a single wavelength necessary to make the interference bands stand out clear and sharp.

Write for Complete details and prices today!



INDUSTRIAL COMPANY

Makers of Standardized Jig and Fixture Bushings

210 N. Laflin St. Chicago, Ill. MONroe 4122

only one work set-up for <u>all</u> operations with





The 10" cross movement of the ram above the work, as well as the 12" transverse movement of the ram, combined with the 360 deg. rotation of the turret head—give a range of operations with one work set-up that is not possible with any other milling machine.

In addition to the controlled movement of the ram and turret, the "All-Angle" milling head can be rotated 360 deg. in horizontal or vertical planes, so that the head can be instantly set to any angle or compound angle.

For positive and accurate travel, ball cranks mounted on feed screws carry 3" dials and are calibrated in one-thousandths. The table working surface measures $7\frac{1}{2}$ " x 29", and has a cross feed travel of 7". Table stops calibrated in one-thousandths.

These are precision tools in every sense of the word — designed by toolmakers for use by toolmakers.

Write for descriptive literature.

FRAY MACHINE TOOL CO.

501 WEST WINDSOR ROAD . GLENDALE, CALIFORNIA

Manufacturers of Fray Micrometer Offset Boring Heads, and Fray "All-Angle" Milling Attachments



THE TREND IS TO TECHNITE

ments, are other functions of such a department.

Planning is essentially a matter of analysis. Whether the plant is large or small, no planning worthy of the name can be done for production or any other purpose until the problems incident to it have been analyzed. This applies to the plant with an established planning department as well as to the plant where one person carries out the function.

My friend's little boy hit the nail on the head:—production planning must be productive planning. A good general standard to use as a guiding principle is to plan so that all employees, machines, and equipment as well as material are profitably employed. This implies careful study of the capacities of men and machines, thoro knowledge of the tools and other equipment required, and detailed separation of each job into its elements thru job analysis and time study.

Job analysis, an exacting study of each job, is a vital part of production planning, and may even be considered the outstanding feature of the work. Routing, scheduling, and dispatching all depend upon it. Of course, the nature of the goods produced and the size of the plant have a great influence upon the type and scope of planning. A plant may be of the continuous type manufacturing a standard product, of the continuous type turning out diverse products, of the assembly type manufacturing standard products, or of the assembly type manufacturing diverse products.

The simplest form of production planning is commonly encountered in a plant manufacturing a standard product of fairly simple design. Here the superintendent merely gives a bill of materials or specifications to the foreman and then confines his planning to personal overseeing of the processes, so the right job is done first and subsequent operations follow in some sort of logical sequence. If a rush order is given precedence over others, he gives this order personal attention and puts pressure on the various processes to insure speedy completion.

RATTLE OF MORE PILOTS MARINES MEN MORE PLANES SUPPLIES

Production of war materials has been speeded up, doubled and increased beyond peace time's wildest dreams . . . work hours have been lengthened, single working forces increased to two shifts, and in some cases to three shifts, seven days a week.

Machines are being operated many more hours and at a higher speed than ever before . . . several years of wear and depreciation are being crowded into one . . . machines are fighting the "Battle of Production" . . . and are proving themselves masters of the job . . . a tribute to their makers.

Many of these machines producing war materials are air operated and most air operated machines are equipped with Ross Air Control Valves...the valves that have been engineered and built to stand up under continuous use and adverse conditions.

Today all of us are in this battle up to our hilts; therefore, let's cooperate with each other. Let us share with you our experience gained through more than 16 years of concentrated efforts in the air control field . . . let us help you get maximum production out of your air-actuated machines and equipment . . . as true soldiers, let us cooperate with you in fighting this "Battle of Production."

ROSS Operating VALVE CO.



ROGERS

SINCE 1885



Conserve High Speed Steel by using Rogers inserted Blade adjustablefor-wear Reamers

JOHN M. ROGERS TOOL CORP.
GLOUCESTER CITY NEW JERSEY

A more advanced form of production planning in the small shop occurs where production is controlled thru a production department under direction cf the superintendent. This department creates a master schedule of production upon which is based a manufacturing order system. This schedule lists the orders and dates on which they are to be completed. Component parts of the order are issued in such a way that the whole job will be completed on the specified date. Periodical reports are required of foremen. Shortages and delays are investigated and corrected.

A still higher form of production planning introduces direct control of certain functions bearing directly upon effectiveness of the production department, such as operation of toolrooms, shop transportation and the maintenance of equipment, requisitioning workers to be hired by the personnel department, etc. By exercising such control, the planning department is in better position to integrate the workings of all departments and thus achieve closer adherence to the general production schedule.

Another and still higher form of production planning occurs where there is a distinct and separate department assigned to that function. Such department is headed by a responsible man, especially trained for that type of work. By planning all work from the viewpoint of production as a whole, the activities of each department are made to blend in with those of all other departments, attaining smooth, orderly flow of production.

There are several advantages to having such a planning department where the size of the plant and the nature of its operations make it profitable. Such a department tends to increase production by determining methods, and by making useful all available equipment to the fullest extent. Charting and directing progress of work, it provides as far as possible for uniform flow of work thru the various departments. It maintains standards of performance and quality, prevents excessive use of materials, finds safe methods and re-



Happy Workers are Seldom Absent

When workers enjoy their jobs they just simply don't want to be absent. And every good American enjoys his work if he understands it and can do it well. But today so many men and women who wish to give their best in the war effort are assigned tasks for which they are totally unskilled, with the result that

they are unhappy.

♦ Management, in the stress of quickly getting into production, has sometimes ignored the good planning and proper tooling which would permit the use of unskilled labor with the least aggravation. In some instances the nuisance value of poor tooling has caused a turn-over in labor and an amount of absenteeism that rightly should not be chargeable to labor at all, but is primarily a management problem.

◆ La Salle engineers have worked with many great American companies in their wartime planning and tooling, in the development of fixtures that minimize the possibility of errors and that take the skill element out of the operation. In reducing tool aggravation, the worker becomes more satisfied with his

job and is much less likely to absent himself from it.

◆ Perhaps your plant has a problem in tool, fixture, and special machine design, or in plant layout. No matter what your production need, La Salle will be glad to discuss it with you at no cost. Just write, wire, or phone us today.

LA SALLE DESIGNING CO., 628 W. Lake St., Chicago, III.



PRODUCTION AND MANAGEMENT ENGINEERING

duces losses due to accidents. It tends to reduce obsolescence by keeping machines and equipment in repair and up to date; keeps plant layout up to date; maintains steady emgloyment of workers and provides for a balanced assignment of labor to various tasks. It brings under one common head, responsibility for planning so that there is a minimum of "buck passing" and provides production records, methods and costs, so that future plans have something tangible to follow.

Makes a Milling Machine out of your lathe in 3 minutes!

Quickly attached to your lathe, the Globe Miller, with accessories, does all types of precision milling, yet costs only a fraction as much as a heavy milling machine. Increases lathe swing 5 to 10 inches, depending on lathe size, uses all lathe speeds and feeds. Write today for descriptive folder.

GLOBE PRODUCTS MFG. CO.
1389 Robertson Boulevard Los Angeles California

All foremen should understand planning methods in their broad aspects and especially details of the particular system used in their own plants. For, beyond question, the best system will fail without the understanding and cooperation of foremen. Every foreman must appreciate the fundamental fact that he is a part of management; the part most frequently contacted by the workers. By his understanding of the principles and purposes of production planning, as manifested in his plant, he is better situated to help in solving the problems of production in his own plant and in his own department.

The two problems of getting out good work speedily, and keeping men and machines economically occupied represent the foreman's handling of the four big factors of his job:—men, materials, machines, and methods.

Not only can the foreman cooperate with the planning department by keeping himself informed about it. He can also offer suggestions for improvement, wherever possible. He can provide time estimates and production capacities on unstudied jobs, make job breakdowns of present methods and describe characteristics of the type of worker needed on the job. He can note storage facilities for work in progress, plan the piling of goods and materials, watching at the same time the safety factors in such piling, and the element of convenience for future handling.

He not only can, but must familiarize himself with the capabilities and limitations of machines and equipment in his department. Insofar as is possible he should have the same knowledge of



DIAMOND ALME TOOLS

Diamonds vary in quality and it is important to use the proper kind for a given job. "Bargain diamonds" are not an economy.

If you don't know diamonds know your diamond dealer. Our 45 years in this field merits your confidence.

ACME DIAMOND TOOL CO.

15 MAIDEN LANE, NEW YORK, N. Y.

A TICKET FOR HITLER'S FUNERAL



This card tells what to do and when

Contents of Rotor Manual on Maintenance of High-Cycle Tools

How Often Should Tools Be Inspected? What To Do When Tools Are Inspected. Correct Amounts of Grease to Use. Ball Bearings—Replacement and Care. Switches—How To-Prolong Their Life. Care and Repair of Cable. Causes of Stator Troubles and Overheating of Tools.

How To Order Spare Parts. Selection of Frequency Changers. "Shorts", "Grounds", Single-Phasing. Fusing For Peak Output. Safety Rules.

Ask for "Keep 'em Working" Manual

MATERIALS for tools are scarce! The more we produce with the tools we have, the sooner we'll K. O. Hitler and his mob.

Here's the "ticket" for greater production, longer tool life and a saving of critical materials:

Keep a simple card file for each tool to show when inspections, lubrications and repairs are made, with list of parts used and when tool is scheduled for next exam.

Inspect your HIGH-CYCLE tools regularly. When service is dusty, blow 'em out daily. Make more complete inspection as often as every 200 hours' running time. Do this:

- Clean out grease from gear case and replace with fresh grease.
- Examine pinion and gear for wear, check rotor shaft and work spindle for play in bearings.
- Loosen live handle, check for grounds; also check plug, switch and cable for grounds.
- 4. Blow out live handle and stator with the air gun.

Maintenance manuals and wall charts for AIR and HIGH-CYCLE portable tools are yours for the asking.



WADE ENVELOPES

protect Shop Orders, Drawings, Blueprints, etc.

Made in three styles, trans-parent, fibre, and metal backs. Non-inflammable acetate windows. Special style or size to order. Write for details.

E INSTRUMENT COMPANY

Phone: CEDAR 4728 1422 E. 189th St., Dept. H, Cleveland, Ohio

the working force under his supervision . . . and in addition keep constantly posted on the types and number of workers available at any time for any type of work.

The foreman should be familiar with methods of requisitioning materials and supplies, of making assignments, keep up with the progress schedules, turning in whatever reports are required of him, accurately as to details . . . and Delays in schedules should on time. be anticipated where possible by the foreman, and the planning department notified. Similiarly, he should advise the planning department as to needed maintenance work in his department, impending material shortages, etc.

He should also act as liaison officer between working force and planning department, keeping the latter informed on causes of any discontent among men as to wage rates, working conditions, hours of work, shifts, excessive physical effort, vacations, overtime, time off, accidents, illness, promotions and other labor problems.

Accurate Hole Transfer Made Easy With **NIELSEN TRANSFER SCREWS**



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. - Inexpensive last for years.

Write for Circular NIELSEN TOOL & DIE COMPANY 1962 W. Eleren Mile Road, Berkley, Mich.

Production planning might be defined as the preparation of a manufacturing program which outlines flow of work and provides for proper control of that flow. Routing determines where, how, and by whom work is to be done. Scheduling determines quantity of work to be completed and time in which it is to be done. Dispatching determines order in which jobs and operations are to be performed and follows thru to see that the schedule is maintained.

Routing and tool design are frequently determined in the department responsible for tool design. Here, practical suggestions of foremen are of great value. The scope of routing is broad and is carried out to varying degrees in different plants. It establishes operations and fixes their order. It determines types of machines, and often the particular machines or work stations, upon which operations are to be performed. It lists tools to be used and allots time for the operations, indicating at what points there shall be

EVANS High Speed Steel REAMERS



LOOK AT THESE FEATURES

- No honing.
 Will not chatter.
- · Chrome-like finish.
- Perfect alignment. Full bearing surface.
 Left and right spirals.
- 50 to 80 thousandths expansion.
- Cannot fall in slots or oil grooves. Extension pilots for line-up work.

SHIP ON 30 DAY'S TRIAL

EVANS FLEXIBLE Ravenswood & Wilson Ave.,

REAMER CO. WRITE FOR CIRCULAR

Modern inspection by optical projection saves time and money

Jones & Lamson Comparators are available in Pedestal, Bench and other types to meet every need in the field of Inspection by Optical Projection. We shall be pleased to study your problems and apply to them the accumulated experience of more than twenty years in this field.

JONES & LAMSON MACHINE CO.

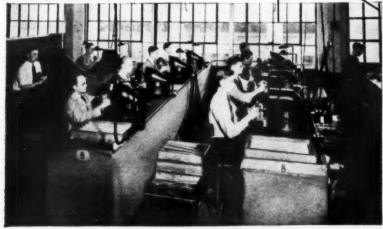
Springfield, Vermont, U.S.A.

Manufacturers of Ram and Saddle Type Universal Turret Lathes. Fay Automatic Lather. Automatic Thread Grinders: Optical Comparators. Automatic Opening



Profit-Producing
Machine Tools







FOR HOLDING END MILLS AND OTHER TOOLS YOU CAN RELY ON UNIVERSAL COLLET CHUCKS

For gripping a tool "as strong as solid steel itself." you simply cannot beat a Universal collet chuck. The Universal chuck in the operating picture shown is holding a Putnam end mill while roughing cuts in high chrome steel. Universal chucks have

ground threads, ample room for tool feed out and nut for Spanner wrench. Write for facts.



PHOTO COURTESY PUTHAM TOOL COMPANY

UNIVERSAL ENGINEERING COMPANY FRANKENMUTH, MICH. inspection. It also divides work into the most economical manufacturing lots or quantities to be handled at any given point in the schedule. This means detailed consideration of space available and speed of each repetitive operation, path of the work, plant layout etc. It also provides proper, convenient forms for the clerical force to record progress of the work, costs, and other necessary facts.

Plant layout has a definite effect upon routing. A good layout facilitates straight line flow of work thru the plant, which usually means efficiency. It helps to eliminate possibility of bottlenecks by allowing adequate space and numbers of machines and work stations for slower operations. Good layout simplifies plant transportation and provides an over-all stability of plant conditions. It reduces errors in routing plans, reduces clerical labor, eliminates backtracking, and simplifies keeping progress charts and other records.

The foreman should be alert to suggest improvements in routing and handling where possible. He should suggest and carry out such changes in plant layout as are feasible and will expedite routing. He should follow orders and specifications closely and see that the men do likewise, watching for errors and correcting them. He should see that aisles and storage spaces are kept clear and orderly. He should issue orders and instructions clearly and give the men adequate supervision at all times.

Scheduling is the adaptation of proper quantity and sequences for orders, following the pathway of the work established in routing. Dispatching has to do with execution of routing and scheduling plans.

Scheduling of work includes establishing the time when all or part of a manufacturing order will start, when it will be completed, and the order or sequence in which lots or parts of a lot will flow. It determines volume of flow, so there will be no accumulation or shortage at any point, and also keeps all processing regulated in the entire plant.

-Welch

QUICK DEMAGNETIZER

Operates 220 VOLTAGE A.C. 60 Cycle



One Pass Does the Job!

This new outstanding unit is necessary wherever magnetic chucks are used. Operating on 220 voltage, any ordinary sized pieces . . . cutters, gears, washers, etc. . . . can be demagnetized by only a single pass through its powerful field. This means a decided saving in time. The Welch Quick Demagnetizer can be easily connected in any handy location in your plant by your own electrician. It is equipped with a convenient switch. CARRIED IN STOCK FOR IMMEDIATE DELIVERY. (Should your power be other than 220 volt, 60 cycle, kindly inform us.)

10 DAYS FREE TRIAL If Desired

Price \$120.00

Write for particulars

Welch INDUSTRIES, INCORPORATED

Makers of High Speed Milling Cutters—Form Tools and Special Tools
20000 WEST EIGHT MILE RD. DETROIT, MICHIGAN



Rolling Machines Roller Dies

Pittsburgh Lock Machines

Pipe & Elbow Machinery

Slitters, Beaders, Crimpers, Flangers

MAPLEWOOD MACHINERY CO.

2634 Fullerton Ave. Chicago, III.

Scheduling in a shop is much like scheduling railroad trains. The railroad has a limited number of tracks and a multitude of trains starting at different times and traveling for different purposes at different speeds to different destinations. The timing with which the slow freight hits the siding, to make way for the passenger limited on a single track line, must be very Delays and accidents have to be met and cleared up rapidly, to permit the balance of the schedule to go thru, and, at the same time, make some arrangement for delayed traffic so it, too, ultimately reaches its destination.

In the shop, equipment is as limited as the railroad's trackage. Work may come to the same machine which will require short operations or long operations. The work should be scheduled to utilize the equipment most effectively. If delays and interruptions disarrange schedules, or accidents cause work-spoilage or stoppage, schedules have to be rearranged and contingencies met, so that the work goes on. Always keep in mind that new schedules should make provision if possible for meeting original delivery dates.

Scheduling has close relationship to the master schedule, inasmuch as the component parts should all arrive at a common center as a completed product in time, form and quantity to meet demands of the master schedule. Process scheduling is also controlled by the

master schedule.

The scope of scheduling is broad. Primarily, the system should fit the need and accomplish its purpose. The extent to which it is carried out in individual plants is dependent upon conditions in the plants. Its usefulness is most apparent in a plant so organized that the person responsible for scheduling knows the definite of his authority and control over production factors.

Scheduling is based upon these facts pertaining to production:—what the management wants made and the exact quantity, a detailed analysis of operating time for each operation, as gained from time study or previous performance, and actual conditions



To lengthen the odds on those "postage stamp" landings, our Navy keeps the flight deck open for business by using the deck below for hanger and warm-up space.

As dozens of powerful engines whine and break into a roar, the ventilation system to suck out carbonmonoxide fumes takes on life and death importance. It is small wonder the Navy is unwilling to gamble on ordinary motors for the power job on these vital fans.

The special waterproof, drip-proof Welco Motors that we build for these fans are just one more example of Welco custom motor service. Dependability in |Welco Motors doesn't just happen. It's engineered.

THE B. A. WESCHE ELECTRIC CO.
1626 Vine St. Cincinnati, Ohio



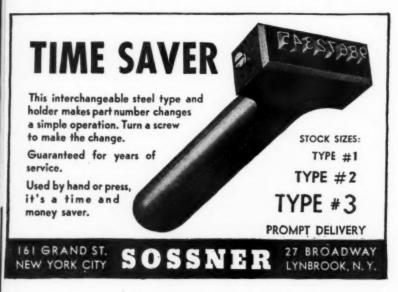
which exist in the shop with regard to work in process in any and all departments at each machine, bench and work station.

When these facts are known, it is possible to predetermine the date and hour of arrival of an order at any department, bench and work station, from start of the order until its completion. Then, with the order of work properly scheduled, effective dispatching permits completion of orders on time. Effective scheduling makes the best use of men, machines, and equipment, and provides for economical progress of work.

The extent to which the function of dispatching should be followed in any plant should be determined by the needs of the plant. Operations involved in dispatching are always present, even tho not always recognized by that name. They may be distributed among any number of people, for someone must see that materials are delivered, that tools are available at the right time at the right place, and that op-

erating instructions are given the workmen. Someone must direct shop transportation; someone must report progress of the work; and someone must keep track of job cards and other records.

The scope and factors included in the field of dispatching vary greatly with the type of organization and plant conditions. Generally they include assignment of work to machines or workmen, reassignment of work to meet changing conditions, always giving precedence to work in regard to its imwhen alternatives Sending tool lists to the tool room in advance of the need for such tools, is another important factor in dispatching. This business of chasing tools often takes up a great deal of the foreman's time. It may prove expeditious to hire a boy as tool-runner. Dispatching also includes moving material from one operation or inspecting station to the next, as determined beforehand by the route sheet, keeping a time record of the start and completion of each job





BRYANT'S specialized experience in the highly specialized field of internal grinding is unmatched by any other organization devoted solely to internal grinding problems.

Whether you're striving for increased war production today or planning new peace-time products for tomorrow, Bryant engineers are geared to help you cut costs and save time.

If you have an internal grinding problem, the solution is simple: Rush it by air mail to Bryant!

BRYANT CHUCKING GRINDER CO.

Springfield, Vermont, U. S. A.



Every Stroke a Count toward Victory! PRODUCTIMETERS

on duty on machines producing war materiel give reliable records of production...eliminale costly over-runs or under-runs...conserve vital materials ...save valuable man hours. They're built for hard usage, extreme accuracy and dependability.

SEND FOR CATALOG NO. 7 TODAY!

DURANT MANUFACTURING CO.

928 N. Buttum Street

180 Eddy Street

DARNELL

CASTERS

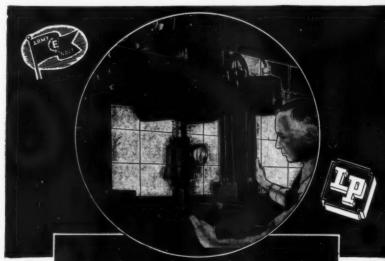
DARNELL CORP. LTD., 60 WALKER ST. HEW YORK M.Y LONG BEACH. CALIFORNIA, 36 N CLINTON, CHICAGO, ILL

FREE Manual

or operation, recording spoiled materials and defective work and taking the necessary steps to have material replaced and causes of the spoilage eliminated. Dispatching also involves recording of the idle-time of men, machines and equipment so that reasons for idleness may be discovered and the proper authorities notifed. Plans may be altered to use these men, materials and machines most economically.

Management usually aims to schedule the output of a plant as far in advance as possible. At the beginning of the production program the planning department considers the orders coming in from sales. Work in the factory is determined by these orders. Sales conditions determine the production programs. With this basic information, the master schedule is pre-While the master schedule pared. originates in the sales department, it takes final form only after the production and financial factors have been taken into account. The master schedule thus shows for some time ahead . . . in some cases for many months . . . the sequence in which the salesorders should be put thru the plant and the dates on which each order should be ready for shipment.

When the master schedule is completed, the planning department makes out the manufacturing orders. These are based on the master schedule. The facts regarding all sales orders are weighed and orders of a similar processing length are grouped into a common manufacturing lot. Likewise, the model or size is considered, and subdivisions or groups made to bring or-ders of like kinds into a common group, thereby dividing the product into economical manufacturing units. Various prefabrications and sub-assemblies of standard parts, are usable on many orders and on different models, are pooled in this fashion. Manufacturing orders are simply orders to the production departments to turn out a given quantity of a particular product in a given time. It depends upon size and scope of the plant whether these will be handled in a simple manner or with various written forms etc. All



It's American Ingenuity

... that has put Pressurematic Power Presses to work forming dies for .30, .45, .50 calibre bullets... press-fitting parts for tanks, planes, munitions... duplicating work pressures on die try-outs... straightening and bending—and doing many other jobs no one thought of until the war made us think!

Solenoid controls stop ram automatically at any pre-selected pressure—or back ram off work! Fast-acting, too—from 0 to 60 tons in 4 seconds! Movable head; adjustable bolster; footpedal controls leave operators hands free. Re-set switch and thermal relays protect motor from overloads. Made in Electric and Hydraulic models.

Electric and Hydraulic Presses \$215 to \$1398

Prompt Delivery

LEMPCO

BEDFORD . OHIO . U.S.A

SEE ONE WORK-MAIL COUPON

LEMCO, Dept. BB Bedford, Ohio Gentlemen: Tell me plant nearest me where I may see a LEMPCO Press in

operation.

ADDRESS___

ADDRES

CITY STATE



MEAD BANDSANDER

It is a time, labor and money saver on innumerable jobs in any shop. Sharpens tools, cutters, etc., of many "kinds". F. O. B. Chicago, \$14.95.

MEAD SPECIALTIES CO. 15 S. MARKET ST. DEPT. 33-Y CHICAGO, ILL.



OVER-RUNNING CLUTCH

A "Free Wheeling" Clutch of simple design recognized for many years as "Standard Equipment" for Automatic Dual Drive Operation – Automatic operation of 2 speed drive—As a ratchet permitting infinite adjustment and as an automatic backstop. Furnished in a number of types.

THE HILLIARD CORPORATION

HILLIARD CLUTCHES

necessary information for guidance in proceeding with the manufacturing should be contained in these orders. It is one duty of the foreman to see that the details of the orders are complete and accurate, so that his department may proceed with production without delay or faulty workmanship.

The number and style of the forms used in dispatching in different plants are known by many names. The more common ones are the route sheet, the job ticket, stores-issues card, instruction card, move ticket, inspection ticket, idle-man card, idle-machine card, work-identification tag, etc. Whatever the names, and whatever the system, bear one thing in mind:-The purpose of all such records is economical control of operations. It is possible to have so many records that mere keeping of them interferes with carrying out other functions of workers or departments. (One executive testified to a Congressional Committee the other day that he spent over 30 per cent of his time filling out various reports required by the Government.) It is also possible to have so few records that nobody knows where anything is or should be, how much is available, or much else. Whatever system is used, it should be as complete as necessary and as simple as possible.

Various mechanisms are used in dispatching and have distinct uses in the systems for which they are designed. Control boards, charts, route files, time clocks or stamps serve to give those in charge of production control, correct and up-to-the-minute information on work in progress.

In the final analysis, it is not the form that the system takes that counts, for no system can run of itself.

Whatever the size of the plant, whatever the complexity of its operations, the same basic problems exist and the same decisions must be made. Someone must assume the same responsibilities. Someone must do the thinking.

And thinking for production planning must have vision, must have resourcefulness, must be fast and accurate . . . and productive! NUCUT TWO-FILE FILING HELPS STEP UP WARTIME PRODUCTIO



COARSE TEETH cutting deep, clean, fast! Fine teeth levelling the surface smooth! There, in a word, you have the NUCUT "two-in-one" File.

Possessing both coarse file teeth and fine file teeth, positioned in an exclusive scientific "Wavy Row" design, it does two file jobs at every stroke. With-

out clogging! Without skidding or scraping! Whether you are cutting, shaping or finishing, you will find a NUCUT gives you more work faster, easier, with less effort. See your distributor for the lengths, shapes and cuts you need for stainless steel, iron, aluminum, brass, copper, slate, wood, fibre and plastics.

NUCUT "WAVY TEETH"

This magnification shows the patented (No. 2027039) "Wavy Teeth" design that makes a NUCUT a twofold-filing file. This exclusive feature assures faster, easier, smoother

filing and helps you meet today's steppedup wartime production demands.

HELLER BROTHERS COMPANY
America's Oldest File Manufacturers
Good Tools Since 1836

Newark, N. J. . Newcomerstown, Ohio



HELLER

WAVY TEETH FILES

Which Wheel Structure for

MOST ordinary tool and cutter jobs and surfacing jobs require either the fairly dense No. 5 structure, or the medium No. 8 structure, the choice being dependent on the size and shape of the tool or part and the area of contact. There are jobs however where the Norton very open,

No. 12 Structure (Open)

No. 12 structure (illustrated) will be found best, such as:

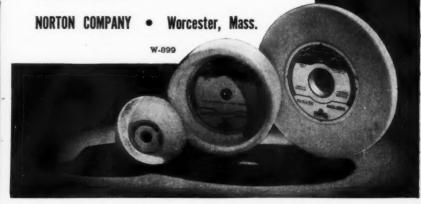
(I) Surface grinding with periphery of wheel of hard, heat-sensitive steels.

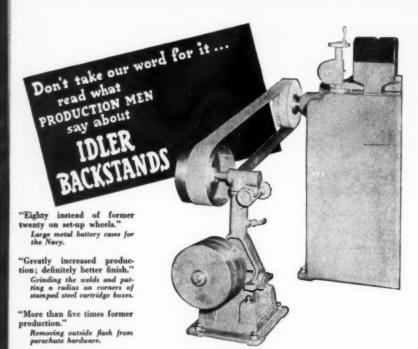
NORTON ABRASIVES

YOUR Job Dense, Medium, Open?

- (2) Hob grinding, especially when heavy cuts must be taken, and
- (3) Form tools or other grinding where accurate contours are required, except where acute included angles are involved. (Structure No. 12 wheels, because of their large pores, should not be trued to a sharp, thin point.)

Norton engineers will be glad to study your tool room and surfacing jobs and select the wheel structure which will be best for each one.





Among the outstanding advantages gained by many war industries through adopting Idler Backstands and Metalite Cloth belts, we list but a few:

Controlled coating of modern abrasive cloth.

Faster heat dissipation-more cutting surface.

Range of grit sizes available-15.

Speed of belt changes.

Reduced loss of abrasive grain.

Retention of desired cushion in contact wheel.

And the change-over to a Backstand is made so quickly, so easily, so inexpensively, you can't afford not to investigate. One of our Field Engineers will give you the fullest help.

Write Us or Phone a Nearby Branch:—Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Grand Rapids, High Point, Indianapolis, Los Angeles, New York, Philodelphia, St. Louis, San Francisco, Tacoma.



creased output."

ings.

"Over five times the former

"Increased production four to

"Excellent finish and in-

Removing brazing metal on slender steel tubing.

Aluminum and bronze cast-

Sanding stainless steel tubes

very similar to 37 mm, shell

output from set-up wheels."

cases.

one."

BEHR-MANNING · TROY, N.Y.

IDIVISION OF HOSTON COMEANY

QUALITY COATED ABRASIVES SINCE 1872

THE " PAPER DOLL " PATTERN TECHNIQUE

A TECHNIQUE of "cutting out paper dolls" and making "jig-saw puzzles" of them is helping to solve one of war industry's toughest problems—the scarcity of vital materials, according to J. F. Cunningham, a General Electric production expert.

"Thousands of tons of metal urgently needed in the war effort today are made available by American industry's refinement of such techniques over a period of years," he explains. "Almost daily, trained planning experts and men on the production line together develop methods of getting still greater numbers of parts out of metal sheets and plates."

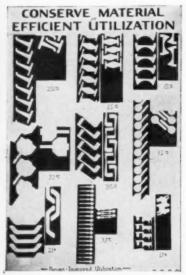
At General Electric plants alone, thousands of parts cut from flat sections of scarce metals go into small motors, huge turbines and other complex electric apparatus contributing to the motive and firing power of weapons of war. Many of these parts are made from flat stock sheets. Some are simple circles, some are triangular and others have unusual shapes resembling stars, banjos or top hats. A few are as complex as the microscopic pattern of a snowflake. But when laid out for cutting from stock sheets, all must be nested so closely together that only a narrow strip of metal will be lost as scrap.



Working with paper segments, J. C. Smith, a G-E planner, arranges a layout for parts to be cut later from metal plates.

After designs for a new G-E product have been engineered, blueprints specifying the shape, size and thickness of parts are furnished the planning department. One of the many responsibilities of this department is development of methods for obtaining the greatest number of parts from the smallest quantity of materials. The best possible nesting arrangements for such simple shapes as squares, triangles and circles can be expressed in simple formulas so that, given the measurement of a part, a planning man can check readily, the ideal length and width of material from which they are to be cut.

Often, however, complicated parts differing widely in shape and size must



An exhibit of nine examples of improved utilization of materials worked out by planning experts at G. E. and other war plants. Strips at left represent old method; at right, the new. Figures show percentage of metal saved. (In this and diagrams below, dark portions represent leftover material. Before they become scrap, small parts are some times obtained from these portions.)



Henry Hakey, G-E punch press operator, stamps a punching shaped like a top hat from a thin strip of steel. By running the strip thru the press twice, in opposite directions, only a thin frame of metal remains as scrap.

be nested together. Here the planning department uses the "cut and try" method. Parts are drawn to scale on ordinary paper, then cut out with a pair of scissors, a practice to which planning men sometimes jokingly refer as "cutting out paper dolls."

The pieces of paper are then shifted around until they nest snugly within the proportionate size of a stock sheet of metal, much as the pieces of a completed jig saw puzzle mesh together. Often parts for more than one product are placed in the same layout in oder to obtain closer nesting. When the planners discover that slight changes in the length, width or thickness of a part will enable more parts to be cut from the same layout, they consult with engineers who designed the part to see if the changes are possible.

The layout is then sent to the factory for guidance in actual cutting. There are several mass production methods

Over 300 CARBOLOY STANDARDS* FOR WAR PRODUCTION

*Standard Stock TOOLS AND BLANKS

Standard stock items are tools and blanks manufactured in mass production, therefore lower priced and more readily available than tools or blanks made to order. Standard tools shown below, in center, can be quickly adapted to meet rush needs by grinding them to special shapes in your tool room.



Boring Tools

Two types: (1) carbide tipped (with flat top or back rake) sizes ¼ "through ½" diameter. (2) solid carbide ¾ through ¾ diameter.

Lathe and Grinder Centers

(Up to 50 times longer life than steel. Available as carbide tips only or finished tippe centers (Morse, B & S.



Standard Carbolov Blanks

For emergency tooling, braze Carboloy blanks to your own shanks. Large selection available.

Sizes 55s" to 55" thick Style 100

Ammunition Dies



General Purpose Standards for Steel, Cast Iron, Etc.

(You quickly grind to hundreds of special shapes. Wide range of sizes)



6 Films Available for Your Plant Training Program

Style 3

Films show detailed step-by-step procedure on manufacture, design, appli-cation and grinding of carbide tools. 35 mm silent slide films (not motion pictures) available at approximate cost of \$20 per set of six.

Masonry Drills

Drills concrete, brick, etc., 75% faster than old methods. Use in portable electric drills or hand braces. Speeds up installation of wiring, piping, ma-chinery, etc. Sizes 12 to 11/2".

Diamond-Impregnated Wheel Dressers

Contains large number of sharp diamond particles permanently embedded in carbide matrix. Eliminates remountings. Saves 25% dresser costs. 3 sizes. For all grinding

*Standard-Design Tools

Standard-design tools are former "specials" for which there has been a large demand within a

narrow range of minor design variation. Standardization now broadly meets most previous require-ments. You order by tool number: eliminate time for drafting, blueprints, quotations, etc.



On Gathe Cut-off Tools



Primarily for interrupted cuts on large forgings or castings.

Send for Catalog

32 page catalog No. GT-142 shows full line of standard-stock and standard-design Car-boloy Tools. On request.



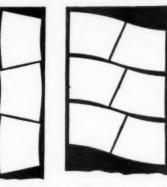
CARBOLOY COMPANY, INC.

Sale makers of the Carbalay brand of ca \$1139 E. S MILE ROAD, DETROIT, MICH. Birminghom, Alu., Chicago, Cisveland, Les Angeles, Newark, Philodelphia, Pittsburgh, Seattle. Canadim Distributor. Canadian General Electric Company, MA, Essatts, Canadia.



Three layouts showing how some parts can be cut from fewer square inches of material. Arrangement at left can be improved by (1) centering them in a narrower strip or (2) by cutting twice as many from a strip less than twice as wide.





of cutting metals, depending on the thickness of the stock. Power-driven shears and saws are sometimes used, as well as punch presses providing pressures up to 600 tons, with which parts are stamped from metal sheets ¼ inch thick or less. For heavier material, up to 11 inches thick and generally referred to as plate, flame cut-

ting torches are used.

The best possible nesting arrangements are particularly important at present for metal plates. Because of war demands, mills are not always able to supply promptly, certain stock sizes. As an example of how manufacturers must plan to conserve materials by revising their nesting layouts to whatever sizes are available, last year production of an important war item was threatened by slow deliveries of heavy metal plates. From these plates were cut a large circle-shaped part, divided into four 90-degree segments. The segments can be cut from a much smaller plate than the full circle would require, and later welded together..

The problem of adapting this particular layout to plates of a size already available was solved by Spencer Frederick, a war worker whose job is to



Such as Conveyors, Assembly Lines, Rotary Tables, etc., require the constant efficiency of

ABART
Combination
Worm & Gear
SPEED
REDUCER



Speed of prime mover cut down by worm. Maximum capacity in final application, provided for by sturdy gears. Ratios 24 to 1, 2000 to 1. Send for Catalog.

ABART gears, all materials, Precision-cut to specifications. Send for estimate. Write





CUB VARIABLE SPEED

For "A" section V-belts 3.3.1 speed range...perfect belt alignment in all positions. Priced so low that no shop or machine need go without infinite speed selection. See your dealer or write \$16.50 (3 Types 8 sizes to choose from)

TRANSMISSION

Standard Transmission Equipment Co.
3409 VERDUGO ROAD LOS ANGELES,, CALIF.

Hits the Mark

WIGGLESWORTH SMALL MILLER



A NEW HIGH SPEED SMALL PARTS MILLER WITH AUX-ILIARY POWER FEED

Outstanding features of this machine are—Heavy single slot deep oil production table. Optional—3 T Slots. Positive adjustable longitudinal table stop. Positive vertical adjustable stop to knee. Cutting lubricant, tank and pump extra. Motor-in-base drive. Timken bearing spindle. Six feeds and speeds Built in accuracy. Write for folder.

191 Bent St.

Cambridge, Mass.

G-E taged obtain mate-

An example of how G-E planners "nest" odd shaped apparatus parts to obtain the maximum use of material.

make the full sized layouts. Some of these nestings are prepared by the planning department. Others, where stock plate is used, are made by Mr. Frederick. The pattern is then followed by flame-cutting machines. He suggested dividing the circle-shaped part into six rather than four segments, because 60-degree segments, having more shallow arcs than those of 90 degrees, can be nested more closely together,



How two rings can be cut from a square steel plate. The second is cut in segments from the center portion and welded together.

side by side. The suggestion saved 537,000 pounds of steel last year. For this suggestion and a similar one, Mr. Frederick has received from the Company, awards totalling \$1025. He is just one of the men on the production line contributing to the solution of material conservation problems by volunteering layout suggestions.

An example of a sheet layout improvement is a small T-shaped part stamped on a punch press. Formerly a strip of metal slightly wider than the "T" was fed thru such a press leaving as scrap, a strip which looks like a long row of "T's" on a typewritten page. Working with the tool designer, a planner discovered that by using a slightly wider strip of material, double the number of pieces could be obtained if the strip were reversed and fed thru the press a second time. Because the "T's" were required in considerable quantity, however, the planning department specified a double die, or one which could stamp out two "T's" at the same time, each one on an opposite side of the strip. As a result, the same number of "T's" could then be stamped out by feeding the strip thru the press once, as had previously been obtained by feeding it thru twice.

In obtaining circular parts which must be of a solid piece, virtually all



Jessop WASHINGTON Carbon Tool Steel is a "high quality" steel specifically controlled in melting and treating to meet exacting requirements. Jessop Research has demonstrated that the balance of elements has an important effect upon the properties of carbon tool steel. Depth of hardening can be controlled by the proportion of manganese and silicon to carbon present in the steel. Jessop WASHINGTON is supplied with deep, medium, or shallow hardening characteristics when specified.

The high quality of Jessop WASHINGTON Carbon Tool Steel makes it particularly suitable for applications where service requirements are unusually severe, or where the cost of making the tool or die is high. WRITE FOR BULLETIN NO. 142. Jessop Steel Company, Washington, Pennsylvania.

JESSOP STEELS

CHICAGO • CINCINNATI • CLEVELAND
DETROIT • HARTFORD



Est. 1901

Carbon - High Speed - Composite Tool Steel - Special Alloy - Statulani, - Buildian-Clief Hillyen-Fiel

of the space remaining in the squares from which they are cut is used. For example, one stamping job called for a number of ring shapes and another for a quantity of pieces shaped like a top hat and twice as thick as the ring shape. At the suggestion of planners, designs were changed so that the thicknesses were the same, enabling both parts to be cut from the same square sheets. Now, in addition to the ring shape, eight top hat pieces are also obtained from a single sheet — one from each of the four corners and four more from the center.

The most obvious method of stamping out circular parts from a long, narrow sheet, on a punch press is in a single line. Several years ago, however, an arrangement was worked out for nesting rows of circles, one below the other, on a wider strip. With the circles beginning each row arranged in a line at an angle of 60 degrees with edge of the stock, a simple mathematical formula was developed for deciding on the width of stock required for stamping out circles of any size.



An arrangement for obtaining a large circular piece and eight small parts for motors from a piece of material.

The planning of nesting layouts comes under the heading of "materials utilization" an industrial term for any method of obtaining the greatest number of parts from a given amount of materials.

Individualized TO MEET YOUR REQUIREMENTS

DESSAU DIAMOND TOOLS

. . . dependability based on over 100 years of specializing in quality industrial Diamonds.

DESSAU performance, dependability and long-range economy result from expert personal analysis of the work every tool is to do, plus painstaking selection of quality diamonds and efficient tool engineering, especially for the job.

It makes every DESSAU an individualized, personalized tool, specifically built for your make of grinder . . . or to meet your special diamond tool requirements.

It will pay you to get the facts on DESSAU personalized service.

Large, complete stocks. All DESSAU Diamonds are direct importations from the British Diamond Syndicate, London. Send for latest circulars giving full details on DESSAU products, and Personalized Diamond Tool Engineering Service.





MAURICE S. DESSAU CO

Industrial Diamond Importers

Diamond Tool Manufacturer

535 FIFTH AVE. . Telephone VAnderbill 63422 . NEW YORK, N. Y.

"Dessau Diamonds True the Wheels of Industry



SIMPLE MAINTENANCE KEEP CP HICYCLE GRINDERS IN CONTINUOUS SERVICE

Cool-numing Tools Long-service Four Long-service Four assured by Tuons assured by Tuons

CP Hicycle Electric Grinders have long been known for their low maintenance costs - lowest of any type of portable tool. But, even CP Hicycles will give better service, with minimum of repair time if they are given ordinary care.

Here are four simple suggestions which will help you keep Hicycle Grinders in continuous service. Do these things regularly and you will cut repair time to the minimum and conserve strategic materials.

Detailed recommendations on other CP Hicycle and Universal Electric Tools will be given in future advertisements. Watch for them.

HOW TO GET MAXIMUM SERVICE FROM YOUR TO HICYCLE GRINDERS



Clean out gear case once a month and fill with grease two-thirds full. Too much will cause churning action and get into motor.



A hot tool indicates overloading, too much grease or too little grease. Check tempera-ture of housing by touching it frequently.



Keep the ventilation openings free of diri.
Once a month - more frequently under dusty conditions - blow out openings with air hose.



A good precaution with all electric tools. Always keep rubber cables free of grease and oil, otherwise they will swell and rot

***** PHEUMATIC TOOLS ELECTRIC TOOLS (Micycle ... Universal) ROCK DRILLS

CHICAGO PNEUMATIC COMPANY

***** AIR COMPRESSORS VACUUM PUMPS DIESEL ENGINES AVIATION ACCESSORIES

SAVE MONEY ON HEAT TREATING

DO YOUR OWN HEAT TREATING

SMALL OR LARGE PRODUCTION Maintain a Complete
Heat Treating
"Department" for Under
\$75 per Month

NO
WAITING FOR
OUTSIDE
HEAT
TREATING

EXPERT RESULTS FROM INEXPERIENCED HELP

UPTON ELECTRIC SALT BATH FURNACES—available for all kinds of heat treat-

ing—are now so highly developed that even your shop apprentice can get excellent results. The salt film of this semi-automatic, fully controlled type of heat treating protects the surfaces of even Moly high speed steels; the UPTON Heat Measuring Control even signals the operator if he makes an error in timing adjustment. If you have an Upton Electric Salt Bath Furnace, you have your own heat treating "department" ready to operate on a few moments notice day or night.

Inton Electric

The controls 250 in predesignatined amount of time and temporature. You suspend the work in the motion salt—as shown in the Einstruction—you leave it there will the hoot measuring control signals you to take it out. AND YOU GET PERFECT RESULTS!



Pays for Itself in 2 to 3 Months
Check the costs of maintaining and operating a heat treating "department" of your own with your present heat treating bills:

*6c PER POUND OF WORK

* \$75.00 per month will maintain the "department" including power under average conditions. This means that even with extremely low production an Upton Furnace may save you money.

No Specially Skilled Help Required
Anyone in your shop can quickly learn how to operate Upton
Electric Salt Bath Furnaces.

Send Now for Complete Details. But please mention the kind of work you do so that we can send you complete information.

FURNACE DIV.

UPTON Electric Salt Bath Furnaces are available for all types of Heat Treating from 300° to 2500° F.



of the most important advances in aircraft engine construction—interchangeability of parts. Their unequalled cutting ability gives the superior accuracy and surface quality needed in machining engine parts.

Many manufacturers outside the aviation field are using this knowledge to lick their own production problems. They're learning that ASCO Shaped Diamond Tools cut at much higher speeds; that they give a superior finish, often eliminating the need for subsequent grinding and polishing; and that they insure greater accuracy on close tolerance work, reducing rejections. Your shop can profit by their experience.

ASCO Shaped Diamond Tools are the product of our more than 30 years' specialized experience in industrial diamond applications.

Send blueprints of your requirements for quotations. Write for folder.

SHAPED DIAMOND TOOLS ● TRUING AND DRESSING TOOLS FOR EVERY PURPOSE ● VALVE RE-FACING TOOLS ● TUNGSTEN DIAMOND WHEELS ● WIRE DIES ● CORE BITS ● DIAMOND POWDER



ANTON SMIT & CO., Inc.

Leonard J. A. Smit, Managing Director

333 WEST 52nd STREET NEW YORK, N. Y.

Detroit: ARTON SMIT INDESTRIAL DIAMOND CO., Inc., 8100 Lymfon Ave.

The Split-Shift Plan for Relieving the Man-Power Crisis

By WALTER C. MASON*

WE know American Industry is on the threshold of a great transition, perhaps the greatest and most significant change in its history. It is a transition concerned primarily with production and—Manpower. It is a transition from normal times of a few years back to complete emergency war conditions as they exist today.

The winning of this war is a responsibility which rests not merely on the shoulders of the employers, not merely on the shoulders of the Government—it is a problem which faces every man and woman in this country.

We cannot leave the solution of the manpower problem to the younger men on the battlefields, on the oceans, or in the air. We cannot leave it to the mechanic, the assembler, or the machine operator who already is doing his part diligently.

It is a situation which demands to the fullest extent, true and righteous co-operation of all of them.

It demands that the men now engaged in war production be augmented with the active help of the men not needed by the armed forces; men who today are not actively participating in the war production program.

The daily flow of men from our factories into the armed services is making the overall man-power picture acute. These men, who are dedicating their lives so that we may continue to enjoy our many freedoms, must be replaced on the production lines. Yet the supply of available men seems nigh

exhausted. It is true more and more women are being taken into war plants—but even this may not be enough.

In order to maintain or increase our rate of production, the answer to the problem may lie in bringing into production jobs the hundreds of thousands — yes, even millions — of men thruout the country who are now in white-collar positions who may take their places, at least part time, on the factory production lines while still holding down their regular jobs.

No man who has spent years in building a successful business, or invested considerable money, desires to destroy the fruits of his labors. Many of these men are willing and desirous voluntarily to give of their time in the furtherance of the production of war materials and implements. Do not misunderstand — these men are true Americans. If they were asked to give up their regular pursuits of business, I have complete confidence in them to feel they would whole-heartedly respond and accept a full time job in a war industry.

Notwithstanding, we are in a serious war. WAR PRODUCTION NEEDS MORE MANPOWER. Something must be done about it at once.

In the late summer of 1942, the Warner & Swasey Co., looking into the future, realized that many of its employees would be subject to Selective Service. In addition to replacements,

*Assistant Employment Manager, The Warner & Swasey Co., Cleveland, Ohio

A RADII & ANGLE DRESSER OF PRECISION AND VERSATILITY



An instrument of precision and versatility...Operation is simple requiring no high degree of skill for accuracy... Any one of the following can be produced with one setting:

One angle
Two angles
Concave radii up to 6⁴
Convex radii up to 4½⁴
Two Angles and radius.
Many other diversified forms to meet requirements.

Wheel size capacity—9* dia; angular travel 3*; for use on universal surface and cylindrical grinders.

Full details available on request.

J&S TOOL CO. 477 Main St., East Orange, N. J.
PRECISION DRESSING TOOLS

we required additional manpower to meet the needs of our expanded plant facilities.

We soon reached the state where immediate action was necessary to meet the emergency.

Mr. Stilwell, our President, on occasions had many of his friends ask him what types of jobs were available in his plants for white-collar men who did not want to give up their regular day jobs.

James Atlee Schafer, president of a coal company in Cleveland, was interested in doing something for the War Program, and hit on the idea of a parttime job. He talked to Mr. Stilwell on a number of occasions about the possibilities of such a set-up.

As a result of these requests and some rather intensive investigation on our part, we found that there was a practical and tangible result that could be attained thru the employment of white-collar workers.

Both in Cleveland and in many other industrial areas, the manpower situation may be termed critical. For this reason, the interesting experiment undertaken by the Warner & Swasey Co., of Cleveland may be of timely interest to everyone responsible for any phase of war manpower problems.

The plan was devised to utilize white-collar workers who, thus far, have had no direct part in the war effort. Since these men were already employed during the day in various civilian pursuits, an eight-hour shift, in our case the second shift, from 4:00 P. M. to 12:00 midnight, was split into two equal parts, viz., 4:00 P. M. to 8:00 P. M. to 12:00 midnight.

Initially, during the latter part of October, 1942, five - two man teams were created, each man working only four hours—one member of each team worked from 4:00 P. M. to 8:00 P. M., then was relieved by his team-mate, who carried on from 8:00 P.M. until midnight. Each man was employed with the understanding that he would work six days per week, Monday thru Saturday.

Thus began the Warner & Swasey four-hour split shift experiments. It

The Fine Points

Industrial's Thread Dressing Tools are available FROM STOCK for all makes of Thread Grinding Machines.

Each Industrial Diamond Tool combines pracision manufacturing methods with Blue Prints specifications. Every Diamond used in these tools passes the most rigid inspection for hardness, ideal shape, and durability.

Precision work must be done by a precision tool—our tools are guaranteed to meet your most exacting requirements—or your money back.

WE MANUFACTURE THREAD DRESSING TOOLS FOR

Jones and Lamson Ex-Cell-O Landis Dalzen Pratt & Whitney

AND ALL OTHER THREAD GRINDING MACHINES

SEND FOR DETAILED CATALOG



DIAMOND CRYSTAL POINTS WILL NOT COME OUT

ALNOR" Velometer An All Purpose Air Velocity Meter -Instantaneous.

Direct Reading.

Measures total and static pressures as well as velocities.

> write for catalog **ILLINOIS** Testing Laboratories, Inc. 150 W. Hubbard, Chicago

is a simple plan-a plan which, I believe, can be applied successfully in every plant, that is comparable to machine tool manufacture. I want to qualify this statement, - to say we reached this conclusion as a result of actual experiences in our plants.

On February 8th of this year, there were 155 of these two-man teams, or more than 310 men, working under the



instantly... Power rapid traverse in all directions...
Brake for ram automatically applied... Bijur Lubrication... Timkon Bearings—Bull gear mounted on Timkon Bearings. Roller table mounted on Timkon
Bearings... Modern Design—built to the highest
standards of workmanship and materials—simplified
operation, powerful yet finger-tip control...
Ask for Circular 726

Morey Machinery 10 Broome Street. New York

SAVE TIME when time is short



TOOL POST TURRETS FOR ALL LATHE SIZES Saves on Setting Up - Saves on Repeat Operations

WRITE C-W-C CORPORATION HAWTHORNE, CALIFORNIA

half-shift plan, each doing a daily fourhour bit-six days a week.

That we are pleased with the results of the half-shift plan is evidenced by the growth in teams since the initial or experimental stage.

You will be interested in the personnel of these teams; and some of the vocations they represent in their regular pursuits:

One team is made of a president and combustion engineer from a retail coal co.

Another consists of a high school teacher and a printer.

One team is made up a food salesman and an electric products sales-

Another is made up of a cartoonist and a manager of a large restaurant.

One team is made up of two attorneys.

A purchasing agent and a shoemaker make up another team.

We have additional teams which include barbers, insurance men, college professors, pastors, newspaper men, engineers, storekeepers, mailmen and office managers.

It will be seen that many of these men bring to their new war-time jobs. a relatively high level of intelligence. This tends to offset, in part, their lack of previous shop experience.

Our four-hour men are assigned to jobs in the assembly and machining departments. In view of the type of work to which they are originally assigned, it is not necessary for these men to have had previous factory experience; and, in fact, comparatively

* The * HANDNIB

a tool for shearing, nibbling and rod cutting.

Cuts irregular sheet metal shapes quicker and better.

Capacity 1/16" flat stock 3/16, 1/4, 5/16 and 3/8" round stock.

An ideal machine for Toolroom-, Pattern and Experimental work.

PROMPT DELIVERY

A HANDY DRILL PRESS VISE

Built-in Parallels
No interference from Chips or burrs
Use it on three sides
Special V-Groove for round shafts
Through Drilling without damage to



THE NATIONAL MACHINE TOOL CO.

1536 CLARK ST.

PACINE WISCONSIN

DRILL GRINDER

Anyone can do expert drill grinding with this simplete-use drill grinding attachment—fits on any bench grinder—saves buying new twist drills—saves time



little mechanical liability is required. We find it is not a hard matter for us to train them in this type of work because of their educational foundation. Because of their business experiences in which many of them have devoted many years to dealing with people. They developed habits of thinking for themselves as well as for others; and, in some cases, their family backgrounds have broadened their spheres of contacts, education, and experience.

These men enter our service as learners, which means we must teach them everything they are to know with respect to the manufacture of War-

ner & Swasey turret lathes.

We exercise extreme care in properly acclimating these men to the shop and shop personnel, because in practically all instances, this is the first time that any of these people have ever been within the walls of an industrial concern. The men are taken into the departments in which they are going to work, introduced to their foremen, who in turn take them to the locker rooms, and in this same process, the foreman



Hardened throughout, self-compensating for wear, precision built. For top production on small South Bend, Sheldon, Clausing, Atlas, Logan and similar bench lathes and small screw machines.



F & M SALES COMPANY, HOLLYWOOD, CALIF.
Manufacturers and Selling Agenta

endeavors to acquaint them with the various shop facilities and very briefly explains some of the policies, rules, and regulations.

The men are then returned to their respective departments and the foreman personally places them on definitely assigned jobs, introduces them to their co-workers and to the instructors by whose side these men will work. The learners, for a few days, work alongside of the instructors or experienced workers and thus they learn thru actual application.

For a period of two or three days, the foreman and assistant foremen maintain a close supervision over these new men so that if they do not seem to be adapted to that type of work, they may be moved to another type of job which may be more to the in-

dividual's qualifications.

Generally all of our split-shift learners start in one of our assembly departments. Whenever any of these split-shift men show any special mechanical aptitude, serious consideration is given to the possibility of placing



"CHAMPION" Steel Racks

Save time, steps and money by keeping bar stock, shafting and pipe out of the way and off the floor.

Write for full details.

The Western Tool & Mfg. Co. Springfield, Ohio



Artus Spacers

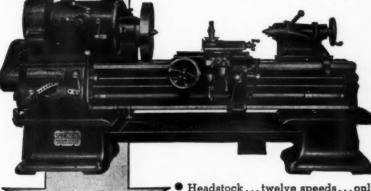
Made of Plastic in thicknesses from .oo1" - .o30". Each thickness can be identified by its color.

IMMEDIATE DELIVERY

Send for detailed circular and price list.

Industrial Products Suppliers 2 Broadway, New York City

S PRINGFIELD PRECISION LATHE Out in front!



SEND TODAY
FOR BULLETIN
No. 161
Tells the why and

Tells the why and how of Spring-field's accurate production.

 Headstock...twelve speeds...only half of the easy-shifting spur gears mesh at one time.

Motors . . . V-belt or silent chain drive. Bed . . . permanently true—made of high test alloy to resist warp or marring under severe service.

Apron . . . extra heavy—operates on Ball and Bronze bearings throughout.

Taper attachment . . . hair-trigger adjustment.

Compound rest . . . sturdy, firm.

Tailstock . . . all bearings and bed ways oiled from one well.

From headstock to tailstock—the SPRINGFIELD Lathe is out in front!

THE SPRINGFIELD MACHINE TOOL CO.

SPRINGFIELD

OHIO, U. S. A.

New UNIVERSAL PORTO- Saves time and money

wherever portable power tools are used for bench assembly. Here are the reasons why:

Speeds up production, stops costly tool breakage, eliminates worker fatigue, and is adaptable to any tool. Very simple and efficient, compact and rugged, complete versatility and requires only 5 minutes to set up.

Write for further details John Nielsen Engineering Co. South Beloit Illinois



SAVES TIME,
SPEEDS UP PROCTION. Graduated scal-, easily read
at a glance. Adaptable to all types, shapes of work, wood or metal. Measures 0 to 4 inch.

FREE LITERATURE and PRICE on request



18

* THE * WONDER CUTTER

The lowestpriced wire and rod cutter on the market. The hardened cutters last indefinitely.

Hand operated. A giant for work, cuts wire and rods up to %-in. round or %-in. square and band iron up to in. by 2-in. Adjustable stop for repeated cuts to same length. Large or small, your shop can use a WONDER CUTTER.

> Write today for prices and trial offer.

The Federal Foundry & Supply Co. 4602 East 71st St., Cleveland, Ohio

them on machining operations. In this respect, an effort is made by the foreman, before the employee is transferred to a machine, to determine the type of machine on which this individual would best be fitted.

We find that the split-shift men now operating machines are doing an excellent job and have exceeded our expec-

tations.

Since the inception of the split-shift program, which is constantly being expanded, we have had a number of sur-

prising results.

One interesting side-light in the success of the experiment is the fact that 90% of the men employed on these half-shift jobs have applied for work in order that they may feel they have some important part in the war effort; 5% of the applicants state they expect they may later be forced to take jobs in war plants anyway; while 5% have applied for monetary reasons. people come to make a definite war contribution-they recognize the importance of machine tools in this war period.



LESLIE WELDING CO.





A Putnam Hi-Speed End Mill

always provides maximum speed in cutting, making possible exceptional finishes with the milling operation alone. Putnam End Mills, on any job, can be depended upon for minimum breakage—a guarantee of full production efficiency in milling.

YOUR CUTTERS Sharp

Check the sharpness of your cutting tools regularly. Don't continue to run them after they have become dull. Dull tools soon become broken tools.



PUTNAM TOOL COMPANY

2983 Charlevoix Avenue . Detroit, Michigan

BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected __ save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

JOHN T. BURR & SON 429 Kent Ave.

Brooklyn, N. Y.

T. H. L. FRONT LEVER

BENCH PUNCH Built for hard, tough work - die can-

PRICE WITH ONE \$50.00

Immediate Shipment.

not lose alignwith ment punch - all parts interchangeable.

Capacity -1/2" holes through 3/16" steel; 13/32" through 1/4" steel. Can also be made for holes up to 7/8" in thinner metal. Stock punches and dies available from 1/16 to 1/2*by64ths.Weight. 70 lbs.

T. H. Lewthwaite Machine Co.

(Est. 1890) 311 E. 47th St

THE SIMPLIFIED ODTICAL PYROMETER



Unique construction enables operators to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep. THE PYROMETER INSTRUMENT CO.

102-105 Lefayette St., New York, N. Y.

Another interesting factor is the rate of absenteeism among this group of part - time white - collar workers as compared to the rest of the plant. Whereas, Management in every industry is concerned about absenteeism, the rate of absenteeism among this group is less than one-half of one percent,

It is estimated that there are, at least, 10,000 men in white collar positions within greater Cleveland available for work of this or similar nature. This represents a potential of 40,000 man hours of work per day.

If 10,000 such men worked four hours a day - six days a week in greater Cleveland's war production plants, it would add 240,000 man hours of work per week to greater Cleveland's war production program, or the equivalent of 5,000 men based on a fortyeight hour work week.

In these times of tight labor markets, this represents a great deal of much needed manpower.

The split-shift plan as inaugurated by Warner & Swasey Co. is not the complete answer to the manpower problem - however, we believe it should go a long way towards helping to solve it.

We are at war-in a dangerous and serious war. Millions of men thruout the country, now in white-collar positions which are in no way connected with the war production program, must voluntarily submit themselves for work on the war production front. men, I believe, represent a considerable part of the answer to the critical manpower shortage which squarely faces American industry today. Failure of voluntary enlistment for war work will result in drastic action on the part of the Government-I don't want to see this happen-and I am sure you don't want any part of it either.

The present world-conflict is everyone's war-the responsibility of winning the war rests on the shoulders of every man and woman in this country -production and greater production is the order of the day.



PUMPS and VALVES

Send for your "personalized" copy of the Fulflo Mechanical Data Book".



MODEL FVM

Nearly

75 Models
To Do Your Job Right

FULFLO COOLANT PUMPS

Simple in construction so you won't be bothered or worried about repairs or maintenance. Once installed they stay put. Sizes % to 11/2".

Coolants are undisturbed by grit or chips as the centrifugal motion maintains a constant outward whirl.

Motor, direct or belt drives. Right or Left rotation.



BY-PASS VALVES

Many models for use in maintaining constant pressures. ¼* to 2*. For pressures from 0 lb. to 350 lbs. Piston types. Cast iron or brass bodies.



Specialties Co., Inc.

Does the TRICK



... OF DUST COLLECTING

For positive, efficient, and economical dust control —Torit does the trick.

Torit Dust Collectors are portable, self-contained units, designed for simple installation to grinding, buffing and cutoff machines. War production demands mean rapid expansion in our factories. Torit Dust Collectors are ideal, as they may be used as auxiliary equipment to large central dust collecting systems already in operation.



Write today for bulletin giving Torit features, specifications, prices, or give us your "dust problem" and let us recommend a solution, without obligation.

TORIT MANUFACTURING CO.

303 Walnut Street St. Paul, Minnesota

TORIT Dust Collectors

For FAST TOOLING of the Toughest Alloy Steels



0

"We have found CMD Helical Groove Centers and CMD Center Point Lubricants the only solution to our problem of tooling stainless steels and chrome alloy steels. These hard metals expand so fast and the heat is so intense that we were always breaking centers or fusing them into the work. With CMD Helical Groove Centers and Lubricants we have completely eliminated this difficulty."

A Prominent Ordnance Plant (Name on request) Helical Groove

CMD
CENTER POINT
LUBRICANT

Visit the CMD booth (No. 8) at the Machine and Tool Progress Show in Milwaukee, March 25-26-27th.

Write for FREE Sample Kit

CHICAGO MANUFACTURING & DISTRIBUTING COMPANY
Dopt 3-BB, 1928 West 46th St., Chicago, III.

- ☐ Send circular on CMD Helical Groove Centers
- ☐ Without obligation to us, send FREE sample kit containing a tube of CMD CENTER POINT LUBRICANT and a tube of CMD CENTER POINT LUBE (grease) with directions for making an amazing, simple test.

NAME

FIRM NAME.

ADDRESS.



MACHINE TOOL BLUE BOOK



The Hartford "Four Point" Milling Vise has performed most successfully for a number of years in large manufacturing plants producing interchangeable parts. It is designed and constructed to take the present day speeds and leeds of modern milling machines. It is

particularly adaptable to small arms milling. Production milling work today must have the greatest speed possible. This, plus other features are available in this vise.

Send for circular

HARTFORD SPECIAL MACHINERY CO.

HARTFORD, CONN., U.S. A.

Rubber Stamps Save Drafting Time

By L. H. REIMKER *

TODAY, we constantly hear in our plants and read in the papers of the necessity for increased production. Emphasis is placed on new tools, methods, processes, plant layout, etc., which will give us greater production per man hour worked, without sacrificing quality or workmanship. In many cases a new process, some change in design, or a better engineered tool will not only increase production in the shop but will give us better quality and greater uniformity of product.

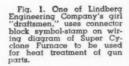
It is very difficult, however, to design new tools, change processes, or change a shop layout to speed up production unless you have a drawing from which to work,—and of course, the quicker drawings are available, the

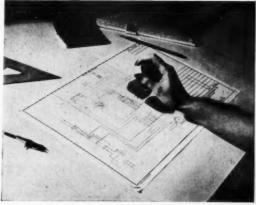
quicker it is possible to make the changes or improvements in question. In other words, a week, a day, or an hour lost in the drawing room delays actual production an hour, a day, or a week, as the case may be.

Practically all drafting rooms or engineering departments use symbols of some sort for switches, pipes, valves, etc., to simplify the making and reading of shop, assembly, erection, or instruction drawings. These symbols are often repeated many times on the same drawing.

For years, rubber stamps have been used to speed up the handling of re-

*Chief Engineer, Lindberg Engineering Co.





Write for Catalog.

NUMBERALL **Numbering Machines**

Automatic and Hand Operated

for stamping in Metal, Fibre, Plas-tics, etc. Do faster and better work than Single Steel Stamps. For Marking Metal Parts, Name Plates, Metal Checks, etc.

NUMBERALL STAMP & TOOL CO., Inc. Huguenot Park, . . Staten Island, N. Y.



M & L PRECISION TAPPER

Taps guided by precision leads. Class 3 & 4 specifications easily met. 4 speeds. Ball bearings throughout. Available as floor model (with coolant system) or table model.

International Inside Micrometers

Highest accuracy and finest workmanship. Available 11/2"-6 & 11/4 -12 sets.



Brand Telescope Gauges 1/20-21/60 Handy Knurler, used like pair of pliers.

BRAND TOOL & SUPPLY CO. 344 No. Vermont Ave., Los Angeles, Cal.



Have you our Engineering Data Sheets on the new line of

GUSHER BABY Machine Tool Coolant Pumps?

Made in four types; 1/30 and 1/10 h.p. for small machine tools and machines requiring from 4 to 10 G. P. M.

Write for descriptive literature.

The Ruthman Machinery Co. 1819 Reading Rd., Cincinnati, Ohio

petitive work such as dates, names, cities, etc. Applying a variation of this practice to our engineering department, we had a few symbols made into rubber stamps. The results were exceptionally good. Gradually the number was increased, and almost every week a new place is found for a rubber stamp.

In addition to the time saved, there is a greater degree of uniformity between the various drawings, and also between the same symbols on any one drawing. Chances of error are eliminated, for if the correct stamp is selected, there can be no error within the symbol itself. Wiring errors are reduced as all numbers are always correct for connections.

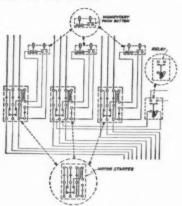


Fig. 2. Portion of wiring diagram for conveyor Hy-dryzing Furnace used for controlled atmosphere hardening of aircraft parts.

Shown in Figure 2 is a portion of a wiring diagram for a conveyor Hydryzing furnace used for the controlled atmosphere hardening of aircraft parts. A complete drawing similar to that shown, but done without the use of stamps would have required approximately 8 hours. By using stamps the time required was reduced to 3 hours. a 5 hour saving.



THE HANDIEST GREATEST RACK YOU EVER SAW

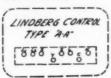
CAPACITY SMALLEST FLOOR SPACE

4 arms, 51* high, stacks 10,000 lbs.; 5 arms, 57* high, 12,000 lbs. flat or round stock. Pipe or tube, less weight. 3 stands for 204 lengths; 2 for 124 or shorter. Use against wall or back to back in center of room. Cost is small, value big.

Write for circular and prices. Princity Regulations govern delivery.

WM. S. YOHE SUPPLY CO. 503 Mahoning Rd., N. E.,

The highest price we have paid for a rubber stamp is \$7.50, and it is estimated that enough was saved in draftsman hours to pay for it on a single drawing.





Precision Drill Grinder



Simple to operate—dependable—speedy—this Precision Grinder will enable you to produce perfect points on standard twist drills in sizes from No. 41 (.096) to 36 (.625).

Send today for more details.

Star Machine & Engineering Corp.

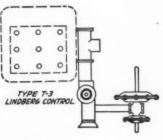
Division Star Electric Motor Co. Bloomfield, **New Jersey**



The GLENNY Adjustable-Expansion BROACH

Produces low cost, accurate keyways. Eliminates set-up time. Self aligning. Interchangeable parts. Adapted for arbor press, mechanical or hydraulic preseure. Speeds up production. Cutter bars in carbon or high speed steel. Details? Write!

EAST SHORE MACHINE PRODUCTS CO. Cleveland, 0. 833 E. 140th St.,









TRANSFORMER





Fig. 3. Typical engineering symbols produced by means of rubber stamps.

During the past months a considerable number of draftsmen have been taken into Armed Forces, particularly







KIRK & BLUM Dust Control Systems

are doing two good jobs for a leading lathe manufacturer

Our assignment for this machine tool plant was to eliminate the saw-dust and wood-shavings in the pattern shop, also the fine metal-dust in the castings grinding department. This called for the installation of two separate systems.

A Down-Draft System using Roto-Clones with specially designed "After Cleaners" made by American Air Filter Co. Inc., was installed in the castings grinding department. Metal-dust from grinders is exhausted through floor and bench gratings into under-the-floor ducts, saving much needed space.

In the pattern shop, a flat screen-type cloth filter with cyclone precleaner is used as the dust collecting medium. Not only are the wood-shavings and saw-dust collected, but the air is returned to the building without heat loss and dispersal of dust on adjoining property is avoided.

In selecting different dust collecting media, we adhered firmly to the Kirk & Blum policy of making unbiased recommendations as to the best type for the individual job.

For efficiency and dependability in dust control— Consult KIRK & BLUM

Send for any of the following Booklets:-

- "Dust Collecting Systems in Metal Industries"
- "Fan Systems for Various Industries"
 "Blower Systems for Wood-
- working Plants" .
 "Industrial Ovens"
- "Cooling Systems for the Glass Industry"
- "Data on Kirk & Blum Production Facilities"

THE KIRK & BLUM MANUFACTURING CO.

AN ORGANIZATION OF ENGINEERS AND MECHANICS

2834 SPRING GROVE AVE. CINCINNATI, OHIO

detail men, and it has been necessary to put in training a number of girls, who are doing a good job. Among this training group, the saving in time thru the use of rubber stamps has been tremendous.

Figure 3 shows symbols of a mercury switch, a transformer, motors, controls, and pushbuttons as produced by means of rubber stamps. Others are connector blocks, relays, motor starters, valves, governors, blowers, name plates, solenoids, etc. Their use is being extend to cover other devices. as well as commonly used names of parts where there is considerable repetition. We have only scratched the surface of the possibilities.

The use of the rubber stamp method, we feel, has helped us turn out war

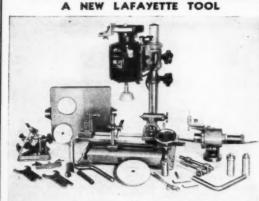
material faster because: 1—Valuable time is saved in doing

routine work.

2—Possibility of errors on drawings is reduced.

3—Manufacturing time is reduced because of better and clearer drawings for the shop.

HERE IS THE NEWEST DEVELOPMENT IN CUTTER AND TOOL GRINDING EQUIPMENT



SAVE TIME, SPACE AND MONEY IN YOUR TOOL ROOM WI.H TH'S NEW CUTTER AND TOOL GRINDER

Precision, accuracy and inish in the grinding of milling cutters of all types—end mills—tapered, straight, spiral reamers—side and face milling cutters—spot facers—counterbores— hollow mills and reamers—staggered tooth mills—gear and form cutters—circular saws—as well as surface and contour grinding—is economically provided by this new Cutter and Tool Grinder.

Simplicity of operation permits fast setups and does accurate, precision grinding in less time than is normally required. Accurate grinding increases production and lengthens cuter life. Compact design of the machine conserves floor space and makes it easily portable.

The precision Center Fixture, may be used separately as a general purpose Bench Center for accurate, economical inspection of circular and cylindrical parts, and any other uses. Parts being inspected are held and rotated on an arbor or on their own centers and moved in a horizontal plane under a dial indicator. Fixture has adjustable tail stock that permits adjusting the centers into precision alignment.

Furnished Complete with all Accessories and Center Fixture.

SEND FOR COMPLETE SPECIFICATIONS.

IMMEDIATE \$350.00 NET

FULLY GUARANTEED

SEND FOR LITERATURE OF OTHER TOOLS.

LAFAYETTE TOOL AND SUPPLY CO.

178 Lafayette Street,

New York, N. Y.

* IT'S ALL THE SAME TO THE

DoAll

SPECIAL PARTS OR 24-HOUR PRODUCTION



A battery of DeAlls in the production line of a large aircraft plant.

The DoAll is doing its bit—and a very big bit—wherever metals, alloys or plymetals are cut and shaped.

Steady streams of parts for guns, jeeps, planes, trucks, tanks, flow over its work table. Anything from a 2000-lb. gun slide to a 2-oz. instrument part—15-ft. channel forms, blocks a foot square, all kinds of molds, dies, and liners, form tools, gauges, machine parts.

DoAll follows a straight line with a precision accuracy—follows any contour design and gives a smooth finish requiring no further machining—does internal and external sawing, filing, polishing.

FASTEST METAL CUTTING METHOD

Because of its speedy, accurate performance, a great deal of shaper, milling and lathe work is switched to the DoAll. Time schedules are whittled down to astonishing new lows. A day's work in an hour—an hour's work in ten minutes—these are typical DoAll results.

CONTINENTAL MACHINES, INC.

1300 S. Washington Ave., Minneapolis, Minn.
Local DoAll offices (See Telephone Directory) distribute
these machines. They also sell and service DoAll Grinders,
Gage Blocks, Band Saws and Files, Parts and Accessories,
Gage Blocks, Band Saws and Files, Parts and Accessories,



Making special dies is easy and quick on the DoAll.

LET US SHOW YOU

A factory trained man will call with a D All and demonstrate many amazing meta sawing short cuts on your own work.

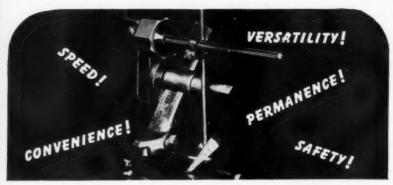
WRITE FOR THIS BOOK

"DoAlls on Production", a picture story performance in many different plants.

THE BIG FIVE

Do All Contour Machines is rapid internal or extern sawing and filing of any kin of metal or alloy. Priced fro \$1,000 to \$5,000, each mod with motor.





Step up Production with

THE NEW WINDERMERE MAGNETIC ADAPTER!

- Today, when speed and time are vital factors in our Victory effort... the Windermere Magnetic Adapter can play an important role in your plant!
- Features of the Windermere Magnetic Adapter include: (1) A magnetic top and bottom surface. (2) A removable upright center post and collar that when detached, transform the Adapter from an indicator holder to a work-holding block. (3) A magnet whose strength is completely adequate to afford the user a wide scope of applications.
- Windermere Magnetic Adapter is available in one size only with upright post in two standard sizes 5/16"; 3/8". Please stipulate size when ordering! \$16.75 in U.S.A. F.O.B., clamp with rod \$2.00.

INQUIRIES FOR REPRESENTATION INVITED

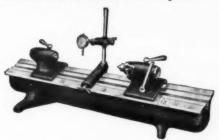
Distributed by

CLUTSOM MACHINES, INC.

205 East 42nd Street, New York City

Equipment for SPEED AND ACCURACY

Tool rooms and production departments will find these tools important aids to rapid, precise work. Prompt deliveries NOW to plants furnishing reasonable priorities. Send for new Bulletin No. 43 and prices.



AMERICAN BENCH CENTER

For testing and checking parts between centers. Three sizes: 4"x10"; 6"x24" and 8"x36". Improved design; box type construction, bed supported on three feet; always solid on bench. Face of bed inclined to allow additional space for operator's hands and to prevent its use as "catch all" for tools. Both heads adjustable. Foot stock spring-operated, with a holding clamp, and a retracting lever to facilitate handling work without changing head adjustment. Regularly furnished with dial indicator reading to thousandths of an inch. Also available with raising blocks for greater capacity.



UNIVERSAL RADIUS DRESSER

Dresses surface grinding wheels to either convex or concave radii, "quarter-tenth" accuracy. A feature is that the grinding wheel is dressed in the same position as it is actually used on your work. Will clear 7½ grinding wheel.



DIAMOND PATTERN LAPPING PLATE

Size 8"x12"; mounted on four legs. Special fine-grain cast iron plate, 14" thick, ground and lapped, and deep cut with 1/16" grooves, spaced 4.". Diamond pattern gives superior cutting action; deep grooves provide long life. Plates should be bought in pairs; easily reconditioned by lapping one plate against another. Recommended for lapping flat surfaces requiring extreme accuracy.



THE AMERICAN GAUGE CO.
125 Bayard Street DAYTON, OHIO

NUPLA PLASTIC HAMMERS

SAVE TIME AND MONEY

In Machinery Assembling-

In Metal Forming-

In Machine Shops—

NUPLA hammers are made of "Cryst-O-Flex", or "Flex-O-Roid" semi-soft plastic, invented and manufactured exclusively by New Plastic Corporation. They are unexcelled for machine shop purposes, machinery assembly work, and metal forming (dural, aluminum, brass, bronze, etc.)

FIVE BIG ADVANTAGES

- 1. NUPLA HAMMERS neither mar nor cut metal or other materials.
- 2. NUPLA HAMMERS prevent "pile up" of materials.
- NUPLA HAMMERS do not sting or vibrate in heavy use, thereby reducing fatigue to a minimum.
- 4. NUPLA HAMMERS have exceptional durability.
- 5. NUPLA HAMMERS are not affected by gasoline, oil, etc.

TWO HARDNESS GRADES:

Grade A—General Machine Shop Use.
Grade B—Hardened Cryst-O-Flex for
Metal Forming.

147.61	at Forming.
SIZES	WEIGHT
1-7/8"	15 oz.
1-7/8"	24 oz.
1-7/8"	2 lbs.
1-3/8"	8 oz.
1-3/8"	17 oz.
1 "	5 oz.
1 "	8 oz.

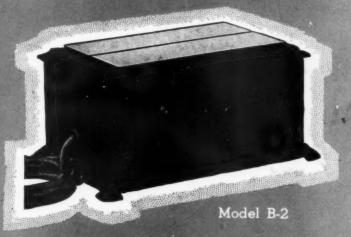
(Ask Your Nearest Jobber)

NEW PLASTIC Corporation

1017 No. Sycamore Ave., Hi. 8208 Los Angeles, Calif.

W DEMAGNETIZERS

Engineered for quick removal of magnetism from work. Model B-2 is for large jobs and Model J-1 for small work. A single pass over the stationary poles demagnetizes the work completely.



Also Mir's of
DIVIDING HEADS
LATHE CHUCKS
POWER HACK SAWS
MAGNETIC CHUCKS
MILLING MACHINE
VISES

Model B-2 working surface 7%" x12"x6%" \$63.20

Model J-1 working surface 7%" x7%"x63%" \$41.15

Both Demagnetizers equipped with pilot light signal controls. Operates on 110 volt AC current.

L-W CHUCK CO.

1-7 N. ST. CLAIR ST.,

TOLEDO, OHIO



IT'S OUR WAR-TIME JOB

With the approval and endorsement of WPB, all our facilities are concentrated on turning out large quantities of wheels 3⁸ in diameter and under. We're at it 24 hours a day, and keeping up with orders. Our central location is an advantage and means no time is lost between our production line and yours.

NEW CATALOG—shows mounted wheels in actual colors and sizes, portable electric tools and time-saving accessories for grinding, burring and polishing.

MAIL THIS COUPON TODAY

HB-3

Send Catalog Free Wheel. Size.....

Name

544!!

YOU, UP THERE on the PRODUCTION FRONTS

No more holding up the steady flow of vital war needs because you're waiting for grinding wheels.

WE'RE RIGHT BEHIND YOU

Can make prompt deliveries on all Mounted Points and Grinding Wheels 3¹¹ in diameter and under. We've stopped making the larger sizes for the duration, so we can fill orders quickly for these important smaller sizes.

Try One Free — Tell us the kind of job, type grinder you use and size wheel you'd like for your test, and we'll send one free postpaid.

CHICAGO WHEEL & MFG. CO.

America's Headquarters for Mounted Wheels

1101 W. Monroe St.,

Dept. HB,

Chicago, III.





Any Machine—OLD or NEW is a BETTER Machine

- * Fingertip Control
- * Faster Speeds
- ★ Heavier Feeds

- * Positive Power
- * Increased Production
- * Better Lighting
- * Modernized Shop Method

with DRIVE-ALL



MACHINE TOOL TRANSMISSIONS

Drive-All transmissions can be applied to any machine tool—usually in not more than two hours due to our patented simple, efficient standard bracket units. Drive-All built-in sturdiness then takes care of your present urgency to get the most production from each machine.

Write for New Catalog

Drive-All Technical Service Offices in Detroit— Milwaukee-Chicago - Boston-Cleveland-Buffalo --Kansas City. Also Dealers in principal Cities.





DRIVE-ALL
MANUFACTURING COMPANY

3402 Conner Ave. Detroit, Michigan

SHORT CUT to swifter production AIRCRAFT BENDING ROLLS



The exceptional simplicity and ease of control of "Buffalo" Aircraft-Type Bending Rolls are vital factors in today's rapid plane production. Eliminating many slow, laborious manual operations, these bending rolls are accurately turning out a wide variety of circular forms—even with unskilled operators. Designed to meet aircraft manufacturers' requirements, with a wide range of speeds, Buffalo Aircraft Type Bending Rolls are on the job day and night helping meet delivery schedules.



BUFFALO FORGE COMPANY

161 Mortimer St.

BUFFALO, N. Y.

Branch Engineering Offices in Principal Cities

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

THE TRANSVERSE TRAVEL METHOD cuts wide steel sections faster - in the

The Walker-Turner Metal-Cutting Radial Machine has two notable features that enable it to give outstanding performance in cutting wide, comparatively flat metal stock. One is the sliding ram permitting transverse travel of 211/2". This enables the blade to feed through the work with a shorter cutting arc and less frictional heat than in other cutting methods.

The second feature is the patented Walker-Turner Geared Motor, the gears of which are fully protected against damage from overload. The shaft operates at the bottom edge of the motor, enabling deep cuts to be made with much smaller wheels than in the conventional motors. The blades being smaller, may also be thinner-effecting a substantial saving in metal. With this machine, it is easy to "trench" or dade, miter and compound miter, as well as make straight cuts. Send for literature.

WALKER-TURNER COMPANY, INC. 1733 BERCKMAN STREET, PLAINFIELD, N. J.



MACHINE TOOLS

RADIAL CUT-OFF MACHINES FOR METAL . MOTORS . BELT & DISC SURFACERS

LEAD-BASE BEARING TESTS

SAVINGS of more than 99 percent in the tin content of bearing babbitt, and the possibility of completely eliminating costly anchoring methods were two of the outstanding advantages reported recently in tests made at The Cooper-Bessemer Corp., Mt. Vernon, Ohio, and Grove City, Pa.

"With a large proportion of the world's tin supply under enemy control." said Ralph Boyer, chief engineer of the Company, "we be-live we have found a most satisfactory alternate for commonly used bearing alloys of high This will tin content. undoubtedly be suitable for all bearings with the possible exception of those subjected to the most severe stresses."

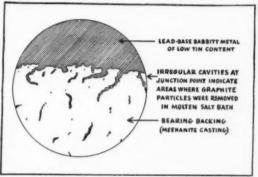
According to research and development engineers of this Company, a comparatively new metal cleaning method known as the "Kolene" process was credited largely for their success in being able to use and satisfactorily base bearing babbitt.

The "Kolene" process is said to be unique in that it provides an exceptionally firm and uniform bond between lead-base babbitt alloy and the Meehanite Metal from which the bearshells are cast.

Using an engine-driven compressor as an example, T. E. Eagan, chief metallurgist, revealed how the huge engine's bearing shells and crosshead shoes were cleansed of surface impurities by means of immersion in salt bath solutions.

The bearing shells are first dipped into a hot molten salt bath to remove the carbon (graphite) particles common in cast iron. By cleaning out these particles in the metal, a considerable amount of anchoring surface is added for bonding the babbitt, as indicated in the illustration.

After rinsing, backings are placed in another salt bath to reduce surface oxidation resulting from the first bath.



Drawings made from actual photomicrograph at Cooper-Bessemer laboratory showing greatly enlarged section of Meehanite backing and lead-base bearing metal. Low tin content alloy flows into irregular cavities, thus providing a secure anchor for bearing metal.

The backings are again rinsed and suspended for a few seconds in cold hydrochloric acid before they are dipped in a flux and placed in a low tin-content alloy which forms a uniform coating on the bearing surface.

The bearing backings, so coated, are placed in proper jigs, and babbitt is poured against them, which readily forms the tight bond necessary to stand the pressure and stresses of big-engine operation.

"The bonding is so uniform and firm," said Eagan, "that we have been able to reduce bearing thickness to a small fraction of that formerly required." According to Eagan, this thin bearing alloy has stood up remarkably well under severe testing conditions.

THE NEW ARMOR PLATE MAGNETIC CHUCK

ESPECIALLY DESIGNED FOR BETTER HOLDING POWER, SPEED AND ACCURACY

TO ANDERSON & BROWN CO. came the call for a powerful, rugged, quick-acting, accurate, armor plate magnetic chuck.

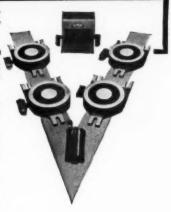
HERE IT IS. It is Cast Steel, sizes ranging from 8" to 22" diameter. Magnetic penetration is 21/4", which is your assurance of intense holding power.

DESIGN ELIMINATES stray magnetic fields. Work is demagnetized as it is released.

WIDE APPLICATION—the 12⁸ circular Anderson & Brown Magnetic Chucks shown may be applied to your grinders, planers or flame-cutting tables. These chucks are readily portable.

THE CHUCKS OPERATE in parallel on 6 volts d-c, supplied by the rectifier from any convenient 110 or 220 volts a-c line. No high voltage discharge and no inductive kickback—no danger of shock.

Send for Special Bulletin on ARMOR PLATE MAGNETIC CHUCKS



It's V for Victory

Anderson & Brown Co. offers its new Armor plate magnetic chucks for better handling of light, medium and heavy plates in our armored tank program.

STANDARD MODELS FOR PRODUCTION AND TOOL ROOM



Speeds Production— Eliminates Clamping— Solves holding problems

"MAGNETIC BODY FLO" is the term applied to the magnetic principle involved in holding work with the ANDERSON & BROWN Magnetic Chuck. The magnetic flux flows through the work, the parallel, and back to the Magnetic Chuck through the working surface, locking and holding all elements tightly together.

CHUCKS ARE PORTABLE; sizes for large or small grinders, planers and shapers.

Send for "Magnetic Chucking Revolutionized"

ANDERSON & BROWN CO.

2036 East 22nd. St. Cleveland, Ohio



Photo above shows Jefferson Turrets on 161 lathe



Convert

YOUR ENGINE LATHE INTO A TURRET LATHE IN 15 SECONDS

Yes it's as easy as that! You simply attach the Jefferson Tail Stock Turret, and the Jefferson Adjustable Pull Feed to your lathe as shown in top illustration.

The productive capacity of these machines will be more than doubled in many instances because there is available at all times nine different tools.

With these three JEFFERSON time saving devices attached to a lathe, any kind of work may be done, such as forming, roughing, boring, finishing, knurling, drilling, tapping, etc. without stopping the lathe or changing tools. The JEFFERSON TURRETS are substantially built, rigid and extremely accurate. Made in several sizes to fit small benchl athes up to 24* swing.

JEFFERSON MACHINE TOOL CO.



MACHINE COMPLETES OPERATIONS FROM SOLID STRIP MATERIAL IN 11/2 HOURS . . .

 Multiple operations on large runs of duplicate parts can be handled quickly and accurately on Gorton Fantograph Engravers. On this job the manufacturer uses Gorton Single Flute High-Speed Cutters operating riuse right-speed Cutters operating at 9,200 r.p.m., and maintains an accuracy of ±,0015" while profiling. The remainder of the operations are performed with a ½" diameter straight shank cutter running at comparable speeds.

The brass index plates made from fg" strip material come to the orton Pantograph Engraver with hree drilled and countersunk boles.

The operations performed are shown on the front and back views of the completed plate.

In addition to work of this nature, the Pantograph Engraver may be used for engraving dies, molds, diale, flat and curved work, and other gen-eral engraving, profiling and lettering

Gorton Engineers, specialists in engraving, die, mold and stamp cut-ting, and super high-speed milling, will be gload to make recommenda-tions on your work—without obliga-

OPERATION Engraving, Marking and Profiling complete from solid strip.

HOLDING -Special Jig with "T" Slot Clamp. FEED-Manual.

SPEED-Top Speed-9200 r.p.m. TIME-13/ Hours Complete.

ACCUPACY - ± 0015".



graph Engraving Machines and Attachments. Also covers other Gorton emgraving machines for spocial purposes.





George EURTON Machine Co.

1317 RAGINE STREET, RACINE, WISCONSIN, U. S. A.

"The REPRODUCING Machine People"

Standard Turret Lathe Tooling

By CARLETON CLEVELAND

THE turret lathe has been forging ahead until it is recognized as the standard machine for turning parts in duplicate, in quantities of from two to several hundred. Likewise, the turret lathe may well be referred to as a key machine in war industry, because of the wide range of cutting tools that may be used on its hexagonal and square turrets, in almost countless combinations.

Satisfactory performance of the turret lathe, like any other machine tool, depends largely upon the selection of tools to meet the demands of the work. Nothing so handicaps a turret lathe operator as a lack of properly selected tools. Indeed, operating profits can be gained or lost in almost direct proportion to the efficiency with which the tooling is planned on every job.

Many times, special tools are impera-



Machining operations on a steel chuck body—The large tool on the hexagon turret is a heavy duty multiple turning head equipped with a stationary overhead pilot bar. The multiple turning head carries two reversible adjustable angle cutter holders and a straight cutter boring bar. These two turning cuts and the boring cut are the multiple cuts which are combined with a turning cut from the square turret. The large drill in the hexagon turret is held in a taper drill socket which in turn is held in a flanged tool holder.

Turning a brake stud from bar stock,-the tool in cutting position being a single cutter bar turner, while counter clockwise those around the turret are:taper drill socket holding a taper shank drill. taper drill socket holding reamer, center drilling tool, single cutter bar turner, and a combination stock stop center drill mounted in a plain tool holder.



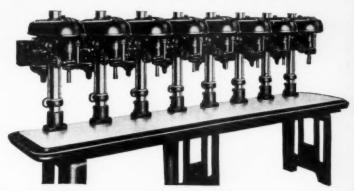
tive, but these are frequently very costly, having to be designed and built by job shop methods. All too often, some change in the design of a product may render special tools useless, necessitating redesigning or complete re-

placement.

For that reason, tooling plans may well begin with a consideration of standard tools as adaptable to a wide range of turret lathe jobs. Proper tools readily adapt a turret lathe to bar or chucking work as needed, and properly selected standard tools equip the lathe for first and second operation work, or for large or small lot production. Profits of turret lathe operations can be increased greatly by planning for the most efficient use of standard tools wherever possible. In one plant, the machining time for production of steel packer nuts produced in large quantities to be used in the oil industry, was reduced from 55 minutes each to 13 minutes each, floor to floor. These nuts are machined from heavy SAE 1020 steel pipe, using a high production turret lathe equipped with a cross-feeding hexagon turret, taper and thread-chasing attachments. For boring, simple single point boring bars are used, and the turret only has to be set off center the proper distance. Large diameter micrometer dials facili-

tate making these adjustments. The leader and follower thread-chasing attachment leads the tools onto the work at a very smooth, even rate of feed, governed by the pitch of the leader. producing a smooth, accurate thread.

The three time-elements that enter into the compilation of production cost of any turret lathe job may be considered roughly as set-up time, handling time, and cutting time. A highly successful plan has been followed in many plants of reducing set-up time to a minimum by the use of a wide range of standard tools,-the heavier tools being mounted permanently at certain tool stations, while other stations are maintained for quick mounting of shank type and other lighter tools which need to be changed for different pieces of work. For still further reducing set-up time, tools using adjustable cutters are of great service, since they can be set to size accurately and be readily adjusted for each new piece of work without removing tool from its station. A Cleveland, Ohio, firm uses a turret lathe equipped with a standard multiple cutter turner on a bar job, three diameters being turned to close limits in a single pass, and the end chamfered. A time saving of 40 per cent was shown, due principally to elimination of excessive set-up time,



LL PRESS COMBINATION exactly as you need them!



New, Exclusive Delta Machine gives you as many spindles as you need-spaced as you need them-at astonishingly low cost!

Now-in one machine-you can get two, three, six, eight, ten spindles or fifty-to suit your exact requirements.



Available with 14" or 17" heads—or any combination of both, with Jacob's chucks or No. 1 Morse-taper spin-dles in 14" heads; Jacobs chucks or No. 2 Morse-taper in 17" heads—high speed or low speed—gives you an efficient, continuous production line, eliminating transferring between machines—and provides maximum working surface. Tables are accurately ground and fitted and the entire unit is heavy, rugged and accurate.



Send for Catalog

Get in touch with your nearest Delta Industrial Distributor or write us to-day, telling how many drill press heads you could use on a set-up like this, whether you need 17" or 14" heads or a combination of both, and how far apart you want the heads placed. We will gladly send you complete specifications and prices.

and prices.



The Delta Manufacturing Company 604-C E. Vienna Ave., Milwaukee, Wis.

Please send us without obligation full information on your new drill press development. We are interested in...drill presses on this set up....17",14", spaced....inches apart.

Name . City State as well as to rigidity of the new tool permitting the use of carbide cutters.

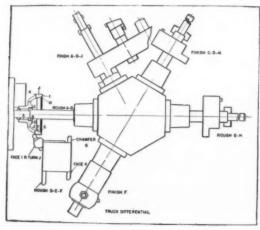
Handling time, one of the three elements mentioned, comprises two elements:—time needed to handle the machine, and time needed to handle the work. Machine handling time may be reduced by mounting as many tools as possible at each station, together with the selection of tools that will take more than one cut at a time. Eliminating one or two needless halts for indexing on each piece of work, helps to accumulate substantial savings even on moderate quantities.

A manufacturer of oil well equipment was machining three different valve parts, using an engine lathe. Two of these parts were required in two sizes; hence five different parts were required.-two sizes of valve bodies. two sizes of middle plugs, and a lower plug. Three of these were produced in yearly lots of 400; the other two in lots of 600; the total quantity therefore was 2400 parts a year, requiring machining times of 6 hours each for the two made in lots of 600, and 7 hours each for those made in lots of 400. Meeting these requirements called for some 15,600 hours of machining per year, imposing a heavy burden on shop facilities and man power.

In an effort to relieve this bottleneck by reducing the machining time, a high production turret lathe equipped with cross-feeding hexagon turret was installed, resulting in an aggregate saving of 65.4 per cent in required time. For instance, machining times were reduced from 7 to 21/2 hours for the three parts produced in lots of 400, and from 6 to 2 hours for the two parts produced in lots of 600. In addition to this yearly saving of some 10,200 hours, gained by reducing the total machining time, other savings were made in required set-up time by the use of standard tools and tool holders, making it unnecessary to change the tool set-up from one job to the next.

Cutting time probably offers the greatest opportunity for time saving. Cutting time may be reduced in some three definite ways:—combined cutting, multiple cutting, and rigid tooling—the use of properly selected standard tools on both the hexagon turret and the cross slide. Multiple cutting, or the taking of two or more cuts from tools at the same station, not only reduces the distance each tool must travel, but the time needed for the entire operation is divided by the number of tools combined. The ample rigidity of mod-

Position of standard tools in hexagon and square turrets for machining operations on a truck differential.

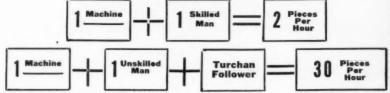


Where Does the TURCHAN FOLLOWER Came In!

Speeds Up Production 3 to 30 Times!



Solves the Man Power Problem!



How the Turchan Follower is stepping up production in war industries throughout the nation is easy to understand, once you be-come acquainted with the simple principle on which it operates.

Take, for example, a milling machine that is the result of years of experience in machine building. Hook a Turchan Follower up with it, and the machine's capacity is immediately increased several times over, even with unskilled labor. Here's the reason why:

The hydraulic cylinders of the Turchan Follower replace the feed screws of the milling

machine on which it is installed. Then, using a templet made to the shape of the part to be machined, the Turchan tracer control valve regulates the flow of oil that moves the tool, automatically producing the finished

The Turchan Follower is also adapted to boring mills, shaper, planers, lathes and high speed milling heads. It's just what you need to solve your production and man power shortage problems.

WRITE FOR CATALOG



Turchan Follower Machine Co. Detroit, Mich.

Hydraulic Follower Machine

ern lathes encourages the use of combined and multiple cuts.

A saving of approximately 33 1/3 per cent in time was realized in turning out fuel pump plunger barrels at an Indiana shop by equipping a turret lathe with a standard type single cutter turner and an adjustable knee tool, in place of the old-style box tools formerly used. The present time of 2.22 minutes per piece compares very favorably with the former time of 3.36 minutes, the saving being due chiefly to the ability of the standard tools to take multiple cuts at increased speeds and feeds.

Another pump manufacturer, located in New England, was confronted with turning operations on parts used in making vacuum, heating, centrifugal, condensation, and sewage pumps. One of these parts, a cone for a vacuum pump, is made of cast iron, and run thru in lots of 25, the work calling for a very accurate taper with the cut starting

at the small end, plus 1.000, minus .002 on finished piece. Here a double cutting tungsten carbide tool is used on the roughing operation, which cuts the length of travel in half—from 70 to 30 minutes—a saving of practically 58 per cent over the former method.

Those who have had experience in a wide variety of turret lathe work, know the importance of being familiar with standard tools and their range of application, and plan to use them as far as possible for every set-up, remembering that makeshift tooling has no place in modern turret lathe work. The original investment in the machines themselves, and the substantial profits they are able to earn when operating to the best advantage, more than justify the expense of complete and correct tooling.

Material and pictures supplied thru courtesy of Jones & Lamson Machine Co., Springfield, Vermont, The Warner & Swasey Company, Cleveland, Ohio, and Gisholt Machine Company, Madison, Wis.





FLEXIBLE shafting provides a ready answer to many power drive and many remote control problems.

Above you see a typical flexible shaft unit. It consists of a flexible shaft and companion flexible casing with their respective end fittings. One end is simply connected to the driving member and the other to the driven member.

For power transmission applications a flexible shaft of the power drive type is used. For remote controls the shaft is of the remote control type. In both types of shaft S. S. White offers a comprehensive range of sizes and physical characteristics. For use with these shafts, metallic, fabric-covered, and rubber-covered casings are available. Shaft and casing end fittings of many different designs are also available.

From these elements, combinations can be made up to meet the requirements of a wide range of power drive and remote control uses. S. S. White engineers are ready to cooperate in working out the right combination for specific applications.

WRITE FOR THESE FLEXIBLE SHAFT BULLETINS

Flexible Shafts are basic mechanical elements, applicable to peace-time as well as to war-time equipment. Every design engineer should be familiar with them. General information and engineering data are contained in the following bulletins. Copies will be mailed to you on request.

BULLETIN 1238

Flexible Shafts for Power Drives.

BULLETIN 38-42

Flexible Shafts for Remote Controls.

BULLETIN 641

How to Make the Most of Flexible Shafts.



S. S. WHITE

The S. S. Wale Dental Mig. Co

INDUSTRIAL DIVISION

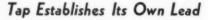
Dept.H. 10 East 40th Set, New York, N. Y.

More Efficient Tapping with UNSKILLED LABOR!

Due to Special Compensating Springs

Production men all over the country report that Procunier Tapping Machines are enabling

hem to get more accurate tapping faster with less tap breakage—despite the shortage of skilled labor. Green help and women war workers are producing like experts on these machines. Here's why: The extra-long spiral compensating springs, with wide range of hand screw adjustments, maintain pre-set tap feeding and reversing pressure INDEPENDENT OF OPERATOR: other Procunier features that step up your tapping output are: 1. The improved Procunier tapping head with double-cone cork-face friction clutch and other exclusive features; 2. Four speeds, ranging from 390 to 2050 RPM efficiently handle jobs for which conventional high speed tapping machines are inadequate; 3. One machine handles tap sizes No. 2 to ½" through two interchangeable heads.



The new Procunier Universal Tapping Machine is exclusively designed so that it actually allows the tap to establish its own lead. There is nothing more accurate than a precision ground thread tap as a guide for tapping—so maximum tapping efficiency is attained where an accurate tap is free to establish its own lead in cutting the thread.

SEND FOR CATALOG

giving full details, description and prices on the full line of Procunier Universal Tapping Machines, hand or foot opera-

Tapping Machines, hand or foot operated, the complete line of Procunier Precision Tapping Heads to meet all needs and the new Tru-Grip Tap Holder.

PROCUNIER

SAFETY CHUCK COMPANY

14 S. Clinton St.,

Chicago, III.

Procu	mier	Chi	uck	Com	pany	
14 S.	Clin	toz	St.,	Chi	cago,	111.

Send me bulletins on: 🗆 High Speed Tapping Heads

□ Tru-Grip Tap Holders □ Universal Tapping Machines.

Name.

Address

City.....State.....

One Answer to THE MANPOWER SHORTAGE...

"We have found Rogers "Perfect 36"

Vertical Turret Mills are very adapt
Vertical Turret Mills are very adapt
Women operators."

Except of a letter from Alfred Stauffer Adaptine Shop, Honey Brook, Penna.



FOR BORING . DRILLING . TURNING

Easy operation... convenient location of controls ... graduated dials to set feeds and main and swivel side head turrets ... simplified set-ups... and motordiven rapid traverse are a few of many reasons why users of Rogers "Perfect 36" Vertical Turret Mills can assign women operators to boring, drilling, reaming, turning, thread cutting both ferrous and non-ferrous castings and forgings.

With today's war conditions creating serious shortages of manpower, more and more women are operating Rogers "Perfect 36's" thus relieving skilled machinists for work on more difficult jobs. If you are short of manpower, write for Rogers catalog TODAY.

PROMPT DELIVERIES AT SURPRISINGLY LOW PRICES

Knowing How Since 1885

ROGERS

SALES OFFICES 129AUTHUR ST. BUFFALO, N. V.

NOW — THERE'S ANOTHER GOOD REASON FOR USING

Ettco-Emrick



KEYLESS

DRILL CHUCKS



WRITE FOR BULLETIN No. 6

which gives full details of the 5 sizes for No. 0 to 1/2 drills.

Etteo · Emrick Keyless Drill Chucks are also available for portable drills. That keyless feature has always been one of the biggest advantages of Ettco-Emrick Drill Chucks. By eliminating the non-productive key-tightening operation it saves time and energy and speeds up drilling.

But now, with more and more women operators, the keyless feature takes on added importance because no strength is required to set up drills so they will be tight —and stay tight.

All the operator has to do is place the drill in the chuck and turn the body by hand just enough to hold it. Drilling action does the rest—and the heavier the load the tighter they hold—which means drills simply can't slip so there's never any need to stop and retighten. Yet the design is such that they can be loosened up by hand as easily as they can be tightened.

Whether you have men or women operators, your drilling is bound to go faster with Ettco-Emrick KEYLESS Drill Chucks. What's more you will get long, hard service from these chucks because they are designed and built to the highest standards of precision tool quality. There are none better made.

ETTCO TOOL CO.

596 Johnson Ave., Detroit

Brooklyn, N. Y.

TAPPING ATTACHMENTS • TAPPING MACHINES

MULTIPLE SPINDLE TAPPING AND DRILLING HEADS

Unexcelled for Design, Materials and Workmanship

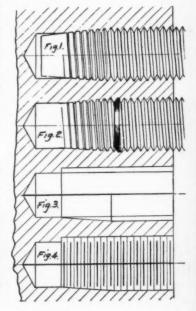
Tapping Holes Economically

By H. F. WILLIAMS

HIS article is directed primarily to designing engineers, draftsmen and machine shop foremen who are lax in the specifications of so called blind tapped holes in machine and other mechanical parts. On many drawings and sketches, these holes are shown fullthreaded to the bottom of the hole, thereby making it necessary to use either a plug, or many times, a bot-toming tap. When a screw must be so inserted as to reach close to the bottom of the tapped hole, it means that these taps have to be used to give a full thread to the entire depth of the hole. In most instances this is quite unnecessary, especially when there is plenty of metal available below the hole. When tapping a thru or open hole, a taper or first tap is used and run thru sufficiently to cut perfect threads the entire length of the hole. This same procedure can be used in blind holes as shown in the illustration.

In Fig. 1 is shown a hole being tapped with a taper tap, the tap being shown in the hole. The flutes of the tap are not shown. Here the drilled hole is deep enough to accommodate the screw engagement plus 1½ times the outside diameter of the tap. The end of tap can be seen just above bottom of the hole. For purposes of comparison, the full depth threads have been shown sharp-pointed like a V-thread while the imperfect threads have been drawn with flats at their crests, these flats increasing in width as the thread becomes more shallow.

In studying Fig. 2, it will be observed that there is approximately one perfect, full-depth thread below end of the engaging screw. The end of the screw has been shaded to make it stand out plainly. It is here, then, that the tap begins to taper, for which allowances should be made in determining the proper depth of hole. It takes ap-





OLIVER DIE MAKING MACHINES

THE basic needs of faster, smoother sawing and filing are met with the Oliver Die Making Machines. Operating efficiency is increased 50 to 60 per cent over hand methods in the making of precision dies, gages, cams, templates and similar products requiring rapid and accurate filing, sawing and lapping operations.

Send for literature describing the line of Oliver Die Making Machines!

OLIVER INSTRUMENT COMPANY 1408 Maumee St., E. - Adrian, Mich.

We also build Drill Grinders, Tool and Cutter Grinders, Face Mill Grinders, Template Tool Bit Grinders. proximately the equivalent of one diameter for the thread to run out and ½ diameter for the plain starting end of the tap.

It requires a little reasoning when specifying the depth of holes. In many shops, the lengths of screws are so standardized as to be graduated in ¼-inch intervals, that is 1, 1¼, 1½, 1¾, 1½, 13½ long and upwards. In fact, the makers of socket or hollow head cap screw, hexagon head cap screws and others list only such lengths in their catalogs. If under-the-head lengths are required in ½ or 1/16 intervals, a special set up is necessary for which a premium must be paid on each screw.

It is a well known fact that the length of thread engagement should be equivalent to 1 screw diameter when a sieel screw enters a steel part, and 1½ diameters when a steel screw enters cast iron. Depending on the thickness of the part to be screwed fast, and because screw lengths advance by ¼-inch intervals, the length of thread engagement may not always be from 1 to 1½ times its diameter. Whatever it becomes, it is then that approximately 1½ diameters are added to the depth of drilled hole.

There is probably less breakage of taper taps than of the plug and bottoming varieties in that the starting and succeeding threads cut to the full depth of thread gradually. In many instances, this is made easier in that a larger hole is drilled previous to tapping, thereby leaving a shallower thread. From 75 to 85 percent of full depth is the practice in some shops where production is high. Taking advantage of this fact, taper taps are sometimes ground off at the end leaving a shorter unthreaded end or socalled starting pilot. When this occurs, the depth of drilled hole may be reduced by approximately 1/2 the thread diameter. However, the taps must always be doctored up before they enter the tool crib to be ready for use.

In Fig. 3 and 4 are shown the methods of illustrating threaded holes on drawings and sketches cut with taper taps. In both figures, the method shown above the center line is approved by



6 SAWS x 24 HRS. = 144 SAW-HRS. PER DAY!

Yes sirl , , . 144 Peerless saw-hours in any war plant means a lot of production! And, as you see in the above photo, "Women at Wark" on Peerless Metal Sawing Machines, is thoroughly practical. Making the first cuts, these women release vital manpower for heavier tasks in war production!

These are safe, fast, accurate, easy-to-operate saws. They conserve metal because the thin, cool-running straight-cutting blade removes as little as %" in the cut 1500 to 3000 square inches are cut with a single inexpensive blade . . . and waste of vital material by rejection at final inspection of Peerless sawed parts is avoided because the patented Four-Sided Saw-Frame and Backing-Plate Blade-Support provide ex-

clusive automatic features that control feed and bladelift, blade-tension, and accuracy to thousands of an inch, without danger of fractures, surface hardening or off-square cutting. The fine steel chips are washed into the chip tray by constant flow of soluble oil.

Manpower is saved because Peerless Saws need only minimum attention in operation, thus requiring fewer men, or women, to run them. Large work tobbles permit loading by crone . . . no manual lifting, no out-end holding. You are sure of 3-way advantages . . . speed, safety and savings in metal and blades . . . when you invest in Peerless Power Saws. Send for latest literature use coupon below.

PEERLESS MACHINE COMPANY . Racine, Wis.

- Quet as	CHEATE S		
Je	POWER	SAWS	☐ Mail catalog on peneral utussy and meaning to Company. Individual Street. City
as.	appor	11	Mail cutting time estimate for Mail catalogom Hydraulic type Saw fee High Penduction Cutting (Mail catalog covering Vertical type used for Die Block Work (Mail catalog on Machanical type faw for production catting (Mail catalog on general utility and maintenance Sawa)
			PEERLESSMACHINE CO., Dept. MT-343, Racine, Wis.

Prompt Delivery of Plug Gages and Adjustable Snap Gages

In Sizes 14' to 4'

OUR GOOD GAGES: Prevent Spoilage Speed-Up Operations

Utilize Less Skilled Help Reduce Costs



MERSH TOWER BUILDING 125 BROAD ST. ELIZABETH, NEW JERSEY, U.S.A.
Phone Elizabeth 3-0523—After 5 p. m. to 9 a. m., Elizabeth 2-9519





the American Standards Ass'n. Below the center line, the tapered or imperfect threads are shown as such. The latter way is not necessary for it means that an angular line must be drawn. And then too, the Company standards book usually makes known the fact that a taper tap is used wherever possible, so that if the thread is illustrated as a full thread within half the screw diameter from bottom of the hole, it is readily understood in the shop. In Fig. 4 is the conventional way, while the abbreviated, short or simplified method is shown in Fig. 3.

At the beginning of this article, it was stated that most holes can be so arranged to make use of but one, namely the first or taper tap. However when a bottoming tap is actually required as in holes where the metal below is thin, then the fact should be made known by a note on the drawing such as "Use bottoming tap" or "perfect threads to bottom of hole." However, where this is not absolutely necessary, there is much to be gained if the foregoing practice is followed.



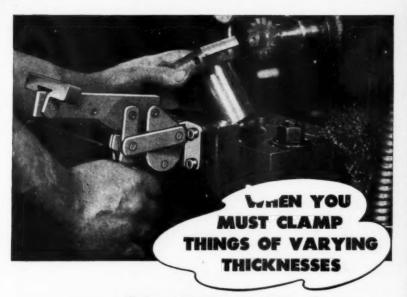
All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the iob.

THREE-FOURTHS OFFSET.

AUTO MOULDING & MFG. CO.

2326 S. CANAL ST CHICAGO SPECIFICATIONS: Open Width %1 to 61 Gage Material .040 to .125 Pin Diameter .101 to % Lengths to 1201

SEMI-OFFSET



... use this KNU-VISE clamp of versatility

Because this KNU-VISE Clamp permits a wide range of clamping applications while base remains fixed in the same position—because it will hold parts or assemblies that may vary in thickness as much as 15°—and because it can be pivoted around the base to any angle or height within 90°—this model is gaining great acceptance in industry. It is raising the efficiency of clamping and eliminates tedious and slow hand adjustments.

Send for new catalog



1322 PLUM STREET,

DETROIT, MICH.

Answer to AWKWARD DRILLING!

IT'S EASY WITH STOW!





FLEXIBLE DRILL SHAFTS . . .

for TIGHT SPOTS!

Wasted time on Close-Quarter Drilling can easily be eliminated just by attaching a STOW Flexible Drill-Shaft to your electric hand drill. You

can then drill within 1/4" of angle corners . . . get around all sorts of obstructions and still be accurate. This amazingly versatile tool requires only one-handed operation—and either the Park 90° Head or 45° Head with Offset Spindle does the job. For heavier work, a 90º Head with direct-geared spindle may be used.

The handy, quickly-attached STOW Flexible Drill-Shaft fits into your drillchuck with a permanent grip; the strong, long-lasting core gives maximum flexing and angularity for hard service, the rugged case provides full protection! For full information on these valuable shop accessories-made as only 67 years of STOW experience can make them, write us today!

TAKES THE TOOL RIGHT TO THE JOB!

For grinding, sanding, wire-brushing, drilling, buffing, polishing or filing —anywhere in the plant—try STOW Flexible Shaft Machines. A STOW unit cleans up in a hurry on pinch-hit work, rush repairs, tool room jobs, or parts assembling. STOW is the "one best tool" that saves you money on a score of different operations!

STOW MANUFACTURING CO.,

30 Shear St.,

Binghamton, N. Y.



STURTEVANT /

your products with measured torque

You too can protect your production with STURTEVANT TORQUE WRENCHES-the permanently accurate measuring wrenches which are used to assure the uniform tightening of screws, nuts and bolts, in most aircraft engines, to control the "set" of threaded parts in delicate instruments, to test the frictional drag in giant dieselsfor controlled uniformity in assembling, for rapid inspection . . . for

testing, gauging, measuring torque applied directly or applied indirectly thru innumerable jigs.

Each day brings new uses for STURTEVANT TORQUE WRENCHES, new applications where they speed production, increase operation control and assure product quality. These patented flat beam wrenches, produced by the pioneer manufactur-

> er of accurate torque wrenches, are practically indestructible and above all are perman-

ently accurate!

ADJUSTMENTS MOVING PARTS FRAGILE MECHANISMS

> STURTEVANT ADDISON QUALITY ILLINOIS

KUTKOST

THE NEW CENTRIFUGALLY CAST CUTTING ALLOY, CONTAINING BORON.

NOW READY FOR DELIVERY IN THE FOLLOWING SIZES:

SIZE	PRICE EACH	SIZE	PRICE EACH
1/4 x 1/4 x 21/4	.95	7/16 x 7/16 x 3½	2.40
5/16 x 5/16 x 2½	1.25	1/2 x 1/2 x 4	3.25
% x % x 3	1.65	5% x 5% x 4	4.70

KUTKOST is supplied in three grades:

- GRADE V: For heavy roughing on all types of high tensile strength materials (1/32* to 1/8* feed)

 Rockwell "C" hardness 61-64
- GRADE X: For medium roughing and semi finish on all high tensile strength materials (.010° to .032° feed) Rockwell "C" hardness 65-67
- GRADE XV For finishing cuts on all types of materials. Also roughing and semi finish on low tensile strength materials such as bakelite, brass, bronze, aluminum, copper, etc.

Rockwell "C" hardness 68-70

GENERAL TOOL & DIE CO.

555 Prospect St.,

East Orange, N. J.

Tools and Dies to Gun Mount Production

By LLOYD STOUFFER

AS the war progresses, and the weapons with which we are fighting it emerge from their trials in actual combat, additional information bearing on their production and operation are made available by the armed services.

Only recently has the Navy permitted disclosure of the fact that Fisher Body Division of General Motors, since early in 1941, has been manufacturing delicate g u n breech housing mechanisms for some of the Navy's largest anti-aircraft weapons. The work is being done at a Fisher die and machine unit.

These complex mechanisms are for 3-inch and 5-inch guns. Such weapons are used to arm the merchant marine, and also as auxiliary gun batteries on some of the larger Navy vessels. Some phases of the complicated housing mechanisms still are considered a restricted military secret.

Production rate on the breech housings is said to have been quadrupled over the original contract for one job, and almost doubled on another. The plant where the housings are manufactured, was in normal times, considered to be one of the finest machine shops in the world.

Since it has changed over entirely to production work, it has frequently been cited as an example of how industry has met and solved new problems in armament manufacture. The project has involved a complete changeover from tool and die work to production work.

Primarily responsible for the constantly increasing production tempo on these intricate parts is the ingenuity of



Fisher engineers, adapting available machines to the work of critical or unobtainable equipment, designing and building new and better tools, and improving process methods.

For example, a rough forging for one of the huge housings weighs more than 6,000 pounds. When it is finished it weighs less than 3,000 pounds. The accepted method for rough machining the tops and sides of the housings was to use a large shaper, requiring two operators. The finish machining was

done on a planer, requiring one operator.

To simplify this job, the plant devised a method whereby three cutting heads were placed upon the planer so that the rough and finish machining were done virtually simultaneously, and only one man was needed for the complete job instead of three. A total of 24 man-hours of labor is saved on each housing.

Formerly, opposite ends of the housings were machined separately, requiring two men. By adaptation of special gauge blocks, both ends of five housings now are machined simultaneously, and the saving is one man and 4½ hours per unit.

One operation relating to the barrel section, formerly was done on a critical vertical mill. Because of the acute angles and contour of the plane, it had to be set into six separate positions. The plant adapted another less critical machine, devised special equipment and now does the job all in one operation.





Thus were saved 18 hours of critical machine time and 10 hours of labor.

Another special setup resulted in saving of 48 hours of critical machine time and six man-hours of labor per unit.

In still another instance, plant engineers designed an attachment part for a machine which permits a \$5,000 machine to do the work formerly done by a machine costing many times \$5,000.

From the start of the contract until the present, such efficiency steps as these have resulted in a total saving of 654 man-hours of labor on each housing.

The production achievements of this plant won for it the first Navy "E" award in the automotive industry. Subsequently it received a Navy burges with a white star added, indicating a year of excellent production. And recently it has become the first plant in the industry to receive the two-star flag for 18 consecutive months of highly efficient manufacturing.

It is not unlikely that gun crews aboard the carriers and other naval craft using these weapons are flying similar burgees for excellent shooting.

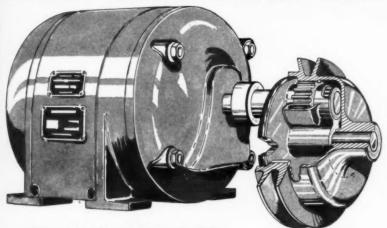


Meehanite • Rigid • Hand Scraped to .0001 accuracy • Thoroughly Seasoned • Perfect Right Angle • Elongated Slots 5/8"x4" • Surface Plate 24"x36" • Angle Plate 18"x19" • Let us tell you of the many advantages of our new Combination Master Surface-Angle Plates

Thomas Wilberton & Company

CEDAR GROVE, NEW JERSEY

HAVING TROUBLE CUTTING 4130?



REDUCE SPEEDS TO 30 F.P.M. WITH

PATENTED

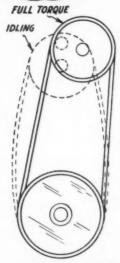
FLOATING TRANSMISSION

2.6 RATIO—INSTANTLY ATTACHED -NEEDLE BEARINGS 5/8" & 3/4" MOTOR SHAFT DIA. SEALED UNIT.

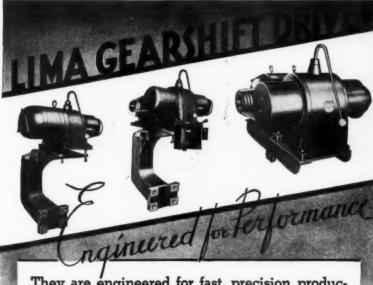
\$12.50 5/8" TRANSMISSION

\$15.00 3/4" TRANSMISSION

KENLEE CORP.,



13931 OAKLAND. DETROIT, MICH.



They are engineered for fast, precision production and to increase operator efficiency and accuracy. That is why LIMA Gearshift Drives are playing such an important part in machine tool and production equipment operations today.

Let us tell you how LIMA Gearshift Drives will increase your production. Wire or write us for address of Lima Engineering Service nearest you.

Buy War Bonds for Quick Victory



Large enough to successfully serve you, yet small enough to give personal attention to your needs.

THE LIMA ELECTRIC MOTOR CO. EXPLOSION - PROOF 1 to 5 HP LIMA, O. 253 FINDLAY ROAD U. S. A. POLISHING LATHES OPEN VERTICAL TOTALLY-ENCLOSED



LIBERTY GRINDING ATTACHMENTS ARE TOOLROOM TIME SAVERS

Yes... you can grind your own broaches... or do a hundred other difficult grinding jobs on hard-to-get-at surfaces, and get them right.

Liberty Vertical and Liberty Horizontal

attachments are precision tools for precision work . . . so adaptable and so skillfully designed that they fit most of the popular surface grinders.

They're On and Off in Two Minutes

Order today, giving make and serial number of your grinder.

Liberty Tool and Gage Works, Inc.

Certain territories are still open for sales representatives. Correspondence solicited.

Tomorrow's Tools for Today's Tasks

The Milwaukee Exhibition

T is expected that an entirely new process for assembling aircraft structures will be revealed at the War Production Edition of the Machine and Tool Progress Exhibition being held in Milwaukee Auditorium concurrently with the national meeting of the American Society of Tool Engineers March 25-6-7. This process, it is understood is neither welding nor brazing, but a combination of the two. It works thru induction heating according to reports, and requires less skill than either conventional welding or riveting.

In the welding field also it is expected that a new welder for aluminum will be shown for the first time which operates neither from line current nor by discharge of condensers. Reportedly, it provides greater control over weld quality and higher speed welding with inexperienced help than available heretofore.

Among the many other new developments to simplify and expedite the war production job which will be shown

A simple fixture which can be mounted on the magnetic chuck of a grinding machine for quickly and accurately sharpening tools for automatic screw machines, thus relieving a "bottleneck" in tool grinding capacity.

simple tool for use on lathes which eliminates necessity of finish grinding of many small parts now requiring use of centerless grinders.

A machine which formerly was used for finishing small dies has been adapted to finishing of relatively complicated parts in production.

To relieve pressure on blueprint departments and make blueprints easier to read, one company will exhibit a high speed "black-and-white" print machine.

A lubricant manufacturer will display typical samples of difficult-tomachine war products with types of cutting oils which have been found most suitable for machining parts of such materials.



from Grinders with DUSTKOP

Model 600 DUSTKOP is quickly attached to any tool, cutter, surface or internal grinder . . . Operated by ¼ hp GE or Howell motor and fan Spun glass, Drum-Type Filter stops dust and returns cleaned air to room . . LOW priced, Write for Bulletin A-500. See our display, Booth 120, A. S. T. E. Exhibition, Milwaukee.

AGET-DETROIT CO.

2042 Book Bldg.

CAdillac 3090

Detroit



PROVIDENCE, R.I.



Minutes are Seconds with the new TWISTITE Vise. Opens to full capacity in one second. Speed Defense Production with this New Vise.



J. A. Richards Co., Kalamazoo, Mich.

BURKE MILLING MACHINES Make Fast Work of Small Jobs

Motor Driven

Timken roller or ball bearings to spindle



Write today for circulars.

Burke Machine Tool Co. 297 E. 16th St., Conneaut, Ohio

ALPHIL
SPOT WELDERS
MORE PRODUCTION-LOWER COST
Used in leading Aircraft
Industries and many
other Government
Plants.
Welders built for both foot and air
Operation. Rocker Arm, Press Type,
Lower Adjustable Arm, Straight Up and
Dawn, Also Swivel Type.
PROBLENS;—CONSULT US. For literature

and prices write to Dept. BM Alphil Spot Welding Co. 44 431 W. Breadway, New York, N.Y. A machine tool manufacturer will show a standard milling machine on which a number of improvements have been incorporated to simplify its use by women operators and unskilled help.

A tool grinder which permits hand sharpening of carbide tools "wet" without drenching the operator has been developed and will be shown.

Another grinder will have a dustcollector built right into base so it can be used for dry grinding in a plant having no dust-collecting system. Separate dust-collectors for quick attachment to standard grinders will be shown by another company.

To aid in simplifying tooling and retooling of war products, several tool manufacturers — particularly in the carbide field—will feature standardized tools. One company will also display a series of training slide-films available to industry for training of new workers in the use and care of carbide tools.

The WPB will operate a consulting office at the exhibit hall, to assist contractors and sub-contractors during the period of the exhibition.

The A. S. T. E. technical discussions will include symposia on such vital subjects as "Women in Machine Shops", "Increasing Tool Life", "Tool Salvage", "Machining National Emergency Steels", "New Production Techniques", "Tool Engineering Horizons", etc.



"KEEP 'EM ROLLING"
Buy United States War Savings
Bonds and Stamps



LEARN ABOUT METAL PLANING

- * Interesting
- * Instructive
- * Inexpensive

 This Treatise on Planers passes on to the apprentice, the planer operator and all those interested in low cost planer operation the experience of thousands of Cincinnati Hypro Planer users.

It briefly relates the history of the planer, gives useful information on planer design and construction and discusses planer tools, setups, special jobs, typical work and various types of planers.

Due to the exceptional value of this cloth bound book a nominal charge of \$1.00 is made. Fill out the coupon below for prompt delivery of your copy.

THE CINCINNATI PLANER CO...CINCINNATI, OHIO

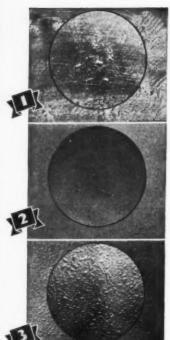
THE CINCINNATI PLANER CO. Forrer St., Cincinnati, Ohio

Attached is one dollar (\$1.00) for which I am to receive a copy of your book, "Treatise on Planers".

NAME _____TITLE

STREET

CITY____STATE_____



These unretouched photos with parts with nicrcle actual size show: I. Bare Casting.

2. Same surface after one pressure pot spray coat has been applied. 3. After application of medium stipple second coat over first coat. Lefthalf shows surface after a coat of Machine Tool Enamel has been applied over the two previous coats.



"There's Class to This EGYPTIAN Machine Tool Finishing System."

SPEED with GOOD APPEARANCE

No need to sacrifice that "classy" look to your machine tools and other metal products. Adopt the new EGYPTIAN Machine Tool Finishing System and you: 1, Comply with WPB Limitation Order L-108; 2, Give Full Protection to your Product without Sacrificing its Appearance; 3, Save Time, Labor and Materials.

Already thoroughly tested in service this three coat system has abundantly demonstrated its efficiency. It produces a stipple effect, minimizing those rough spots found in every casting by blending them with the rough finish. Can be used also for a smooth finish when desired.

Fast, air drying, with no primer required, this new system is oil and alkali resistant, may be applied either by brush or spray gun, and finishes level, rounding out as it dries.

Send for trial order at drum prices.

And send for our Gov't "Spec"

Book MT



THE EGYPTIAN LACQUER MANUFACTURING CO.

ROCKEFELLER CENTER

NEW YORK

EGYPTIAN Superior FINISHES SPEED IN TO MAXIMUM PRODUCTION COLLET CHUCK SPINDLE LATHES



- FULL SPINDLE CAPACITY
- NO STOPPING OF MACHINE
- FITS LATHE, MILL & DRILL PRESS
- NEEDS NO KEYS OR WRENCHES
 NO PUSH OR DRAWBAR ATTACHMENTS
- UNSURPASSED FOR PRODUCTION

See your distributor or write for literature

Allisan

TOOL & ENGINEERING COMPANY

4031 WHITTIER BLVD. LOS ANGELES, CAL



DELIVERY IN 3 MONTHS!

Consult our nearest representative or wire factory direct at our expense.

LIBERTY PLANERS, INC.

1014 WELLER AVE.

HAMILTON, OHIO, U.S.A.

"Let's Talk Shop!"

Getting Maximum Production from Cutters

REATLY increased demands of war production and the growing shortage of high speed steel are mainly responsible for a serious shortage of milling cutters. Already, the equipment of cutter manufacturers is greatly overtaxed in an effort to produce an unprecedented volume of cutters to meet today's war production requirements. Handicapped somewhat by shortage of skilled labor, in spite of striving to maintain "around-the-clock" production, the problem hasn't been helped because of the many added needs for special and formed cutters. And so many of the latter are on high priorities for urgently needed aircraft and munition production that cutter manufacturers are unable to turn out sufficient stock cutters to reduce the heavy backlog of orders and thus improve deliveries. For the time being, it seems that the only solution is for every cutter user to GET MORE WORK OUT OF EACH CUTTER.

Many points frequently overlooked in normal times, need serious attention to-day if our war production is not to be handicapped thru this critical shortage of cutting tools. Making each cutter last a little longer, as well as preventing unnecessary breakage, has now become a necessity.

Operators as well as others responsible for production can contribute greatly in this effort by observing these points:—

Prevent Cutter Chatter

Chatter is not only one of the major causes of poor finish, but often results in serious damage to the cutters. While there are many factors that contribute to causing chatter, usually it is caused by too much tooth clearance, lack of rigidity of the cutter drive or lack of sufficient rigidity in the machine.

Mount Cutters Properly

Proper mounts are essential to give the cutters the rigid support needed for best performance, but of primary importance, the cutters should be mounted as close as practicable to the spindle.

Use the Right Speed

This is especially important with small cutters such as end mills, so that they will run at the same surface speed as would be required for larger cutters on the job.

Handle Cutters Carefully

Cutters can be damaged by improper handling as well as in use on the machines. In particular, prevent damage to the cutting edges.

Watch Cutters for Wear

It is false economy to run cutters until the dulling becomes excessive, meaning that entirely too much metal must be removed in the sharpening process. Ordinarily on production jobs, the greatest economy is obtained by sharpening the cutters after a predetermined number of cuts regardless of the wear, rather than to take a chance on permitting excessive dulling.

Look to The Machine—The Arbor— The Work

Besides the foregoing points, pertaining more directly to the cutters, keep in mind that the machine also is important in influencing cutter performance. Make certain that the machine is heavy enough to stand the cut, that it is in good condition and properly



Boyar - Schultz PROFILE GRINDER No. 2

Designed to perform intricate contour and profile grinding in tool and die work, its great capacity for this type of grinding is being successfuly applied to production in building tanks, aircraft and other heavy munitions.

The model shown above is a truly versatile machine tool with 2 grinding spindles, each operating at 10,000 R.P.M. This assures highly satisfactory work on any contour grinding likely to be encountered in tool and die making and in production. It is a machine that can soon pay for itself in time saved.

Send for Circular

BOYAR - SCHULTZ CORPORATION 2108-C Walnut St. Chicago, III. adjusted. See that the machine is set for the correct spindle speeds as well as table feeds for each set-up. If the job requires coolant, use enough so as to get the full benefit.

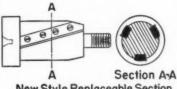
The arbor also can contribute to getting the most out of cutters. One of the first requirements is that the arbor used must be of ample diameter to aid in giving proper support. For true running of cutters, thoro cleaning of taper holes before inserting shanks of arbors is essential, as well as making sure that the ends of the collars on the arbor are not bruised.

Lastly, the work being milled must be rigidly clamped and properly supported. Otherwise premature cutter wear may develop and cutter breakage

occur.

Replaceable Section Arbor

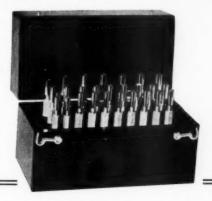
Simplification of a difficult toolroom operation and savings in labor and material in the production of small aircraft motors were accomplished at a General Electric plant with a replaceable section arbor developed by F. W. Smith, one of the Co.'s tool designers.



New Style Replaceable Section Arbor

The life of solid stacking arbors for alignment of punchings during assembly of the stators for small, instrument-type motors was found to be very short because of wear occasioned by pushing 0.010-inch laminations over surfaces precision - ground to very close tolerances. The sharp edges of the silicon - steel punchings cut into the arbors easily and soon destroyed their alignment properties. Further difficulty was encountered because the punchings were stacked on an eight-

Van Keuren PLUG GAGE SET



Van Keuren Set A-Z, 26 sizes taper insert American Gage Design. Class B plug gages complete with handles and case, including all letter sizes from A (.234" diameter) to Z (.413" diameter), Price \$140.00, Available from stock,

We are prepared to furnish special sizes of plain cylindrical plug gages up to 1.510" diameter. Mail or wire orders to Van Keuren. Large stocks of alloy tool steel blanks and steel handles are available for rapid processing upon receipt of exact specifications. The Van Keuren Co. is one of the few plants in the United States equipped to manufacture Class XX tolerance gages; the experience of over twenty years of gage making and the last word in modern heat-treating, grinding and lapping equipment are combined in this plant to produce fine gages in the shortest possible time. For prices on Class XX, X, Y, or Van Keuren Class "B" (total tolerance .00005") gages write for catalog No. 31.

CONSULT THE VAN KEUREN CATALOG FOR DETAILED ACCURACY "ULTIMATE ACCURACY"

THE VAN KEUREN CO. WATERTOWN, MASS. 176 WALTHAM ST.

Light Wave Micrometers Wire Type Ting Wires Gear Measuring Systems Light Wave Equipments
Measuring Wires
Light Wave Micromet
Thread Measuring Wires Wire Type Plug Gages Shop Triangles

FOLEY FILED SAWS Increase Sawing Production

25 % 40 %

Your saws

will cut fast-

er and truer and stay sharp long-er when filed on a Foley Saw Filer. The exclusive patented Foley jointing principle straightens up uneven teeth and makes them perfect in size, shape, spac-

ing. That is why Foley-filed saws in-

crease sawing production 25% to 40%. The Foley also cuts down filing time, saves on files and reduces saw breakage. Any man or boy can operate the

FOLEY AUTOSAW FILER

The Foley Filer is the only machine that sharpens cross-cut circular saws 3° to 24° in diameter, band saws 1/6° to 41/2° wide—all hand saws.

FILING SAWS FOR VICTORY

The Foley Filer is in use by U. S. Army, Nevy, Air Force and many other Gov't Depts.—also by hundreds of War projects and industrial plants.

30-DAYTRIAL OFFER

Find out on your own work how much the Foley Filer can save you. We will send it on 30 days' trial. Write for details.

FOLEY MFG. CO.

28 Second St. N.E. Minneapolis. Minn. Also makers of Foley Saw Grinders, Saw Setters, etc. degree spiral. As a result, three lands 0.025-inch wide extending into the slots had to be machined on the arbor. As these lands wore thin, an uneven, saw-edged slot often resulted.

Smith found that by machining the body of the arbor undersize and milling out slots about %-inch wide in it, spring steel lands could be used. These are held in place by keys, attached to the arbor by flathead screws, and ground to correct bore tolerance when assembled. Replacement lands and keys are carried in stock to be assembled to the arbor bodies when wear becomes apparent.

Intricate Compression Die

An intricately shaped H.S.S. compression die was completely processed with a Slotmaster. After the blank had been bored and the detail of the design scribed on its surface—a roughing and then finishing cut were made



The finish cut was held to between one and two thousandths. It was so accurately done that when checking the die by rotating the lapping punch from position to position, it could be pressed thru the die in any position.







SUNOCO EMULSIFYING CUTTING OIL

improves finish . . . cuts cost . . . on grinding operation at gun plant

With so much depending on them, American guns have to be good. They arel On the far flung battlefronts of the world, rifles and tommy guns, howitzers and 16 inchers produced in American factories are proving to be without equal.

One contributing factor in making possible the nth degree precision of these guns is Sunoco Emulsifying Cutting Oil. For example, one large plant was having trouble with the finish of its gun parts. At the suggestion of a Sun Oil Engineer-one of those well-known Doctors of Industry—a change was made in the coolant on the grinding operation. One part of Sunoco Emulsifying Cutting Oil was mixed with 45 parts of water and tried on one machine. Improvement in finish was so marked it could be seen with the naked eye. Immediately Sunoco was adopted for all machines using a soluble cutting oil . . . and besides getting better finish. the company saved nearly 50% in cutting oil cost!

That's typical of how Sun Oil Engineers and Sunoco Emulsifying Cutting Oil are helping the metal working industry in its tremendous war effort. Prove Suneco's production-boosting merit in your own shop . . . under your own conditions. Write

SUN OIL COMPANY . Philadelphia Sen Oil Company, Ltd., Toronto and Montrool, Conada

SUN PETROLEUM PRODUCTS HELPING INDUSTRY





The lapping is a most interesting part of the operation and requires a man's time only while he is setting up the job, etc. It is started by lowering the punch to the mouth of the die opening and then setting down stroke of slotter so that it will completely compress the coil spring, mounted between a shoulder on the shank of the arbor and the punch. The spring then gradually relaxes and the punch works its way thru the die as a result of the spring pressure and stroking of the slotter. When the spring is completely relaxed—downstroke of the slotter is again set up completely to compress the spring and the operation is repeated until entire surface of the die has been lapped. Thus, tedious hand lapping is avoided and all of the accompanying inaccuracies, such as bellmouth, etc., are eliminated.

(Photo — Courtesy Experimental Tool & Die Co., 12607 Greiner St., Detroit.)

Vou

It isn't the size of your bankroll Or the house you own or rent That makes you a success or failure; It's the measure of your self-content.

When the day's work is over And you've put your pipe on the shelf, And you sit alone, just thinking, What do you think of yourself?

The world may acclaim you a hero, Great things in the world you may do; In the end all that matters Is what you think of you.

(B. & H. Builder)

Safety Devices Protect War Workers

Safety devices played an important role in helping to cut the accident rate during the first half of 1942 at the Westinghouse East Pittsburgh Works, despite a 21 per cent increase in employment. Such safeguards are doing their part in conserving manpower by protecting the eyes and hands of the men and women now producing vital war material in America's machine shops. Inexperienced workers, longer hours and the difficulty of replacing skilled employees all contribute in





FAN COOLED 1 TO 15 HP
Ball bearing. Steel built. Sealed

Ball bearing. Steel built. Sealed against harmful oil chips and abrasives. Made for real production.

TORQ-QUA-MATIC drives For machine tool conversion

- 4 selective speeds
- Sizes, 1 to 15 HP.
- · Alloy steel gears
- Anti friction bearings

Proven design—Improves production up to 25%

Send for free descriptive literature containing details on Torq and Torq-Qua-Matic drives.

THE TORQ ELECTRIC

6605 CARNEGIE AVE.



MANUFACTURING CO.

CLEVELAND, OHIO

ERICKSON

Precision

COLLET



ERICKSON STEEL CO.
2309 HAMILTON AVE.
CLEVELAND, OHIO

making the accident prevention problem particularly critical. Typical safety devices used in Westinghouse plants are illustrated.



DUAL CONTROL MAKES PUNCH PRESS SAFE. It is impossible for the workman to injure his hands or fingers while operating this punch press. Both hands must be used to push the two control buttons lowering the "upper jaw" of the press with 215 tons pressure.



GUARD CLEARS HANDS IN CLOSING. The operators hands are automatically



SAVES TIME • TOOLS • POWER • REDUCES FATIGUE • CUTS REJECTS

★ Individually powered by Constant High-Speed electric motor.

* Light-weight, vibration-free working tools

★ Ball bearing equipped straight and angle spindles make for easier operation and longer service

* Working speed 4500 r.p.m.

★ Caster base or overhead trolley mounting for motor provides maximum portability and permits a more efficient motor winding to dissipate operating heat

★ Flexible shaft follows operator's movements

Available for Victory production. Full details upon request.



3 H.P.

UNIT

MALL TOOL COMPANY

7742 South Chicago Avenue

Chicago, Illinois



With one set-up on these tools, these gauging operations can be performed:

- Check dimensional accuracy of addendum cone (gear face) as related to thrust face of hub.
- 2. Check accuracy of cone angle.
- 3. Check run-out of gear face.

There are no difficult operations or involved calculations. The gauging may be done accurately by an operator with a knowledge of blue print reading and ordinary gauging experience.



Write us for descriptive folder.

HERKIMER TOOL &
MODEL WORKS
1010 George St. Herkimer, N. Y.

cleared out of the closing press by the sweeping motion of the bar under the operator's arms. This is a remodeled printing press which has been converted to use steel rule cutting dies for thin materials.



GIRL'S HANDS SAFEGUARDED. To operate this punch press, both hands must be on levers at either side of the machine. The tool head is lowered when levers are pressed simultaneously—preventing hands from getting caught underneath the moving part of the press. Tweezers in the right hand are used to handle the metal piece about to be punched.

New Carboloy Data

Two new releases by Carboloy Co., Inc., 11139 E 8-mile Blvd, Detroit, are announced by the firm.

Catalog GT-142 details standard tools, boring tools, cut-off tools, reamers, diamond-impregnated dressers, blanks, etc. and contains considerable know-how and maintenance information relative to the equipment. Special insert lists prominent firms and items of Carboloy manufacture they use.

Manual GT-141 deals with Carboloy Cemented Carbide Tool Grinders, giving full details and specifications of the company's machines, chip breaker grinders and bench type tool grinders.

INDEX MILLS

FOR 1943 * * MANUFACTURED BY INDEX MACHINE & TOOL COMPANY



Index Mills for 1943 are improved through new patterns obtaining heavier column, knee. saddle and table. As well as being somewhat heavier the machine is four inches higher than the machine which made so many friends in 1942.

The machine is used for milling, drilling, and boring on tool, die and experimental work, also hundreds of contract jobs on war parts are being turned out in step with our present day increased rate of production.

Being equipped with a ball bearing spindle, that requires no regreasing for two years, mounted in a head that swivels 90° right or left and having power feed quill move-

ment, the machine is very versatile on jig and fixture work as all machining locations can be done to vernier precision through verniers mounted on the table slides cross and longitudinal.

End mills from 1/6" to 3/4" diameter can be used in tool steel taking full cuts. Spindle has No. 9 Brown & Sharpe Taper. Holes 3" diameter can be bored in steel with a fly cutter. A piece 8" x 16" can be worked milling, drilling and boring at one setting.

The machine is made by Index Machine & Tool Company, and sold through Blank & Buxton Machinery Company, Jackson, Michigan, and wides on amplication.

who will be glad to furnish descriptive folder and prices on application.

BLANK AND BUXTON MACHINERY CO. JACKSON, MICHIGAN

MOTOR MICA

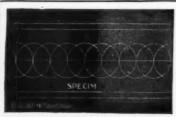
ANTI-FRICTION COMPOUND

Motor-Mica will solve your toughest inbricat-ing problems. Prevents metal to metal contact. Cools HOT BEARINGS.

SPEEDS UP Stamping, Turning, Drilling, Milling, Threading, Boring, Die-Casting, Tapping, Serew Machine,

Immediate Deliveries Other Operations Packed in 5-10-25-50-100 lb. Containers

Write for free sample! SCIENTIFIC LUBRICANTS COMPANY Dept. H. 3462 N. Clark St., Chicago, III.



DYKEM STEEL BLUE STOPS LOSSES making dies & templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

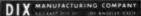
THE DYKEM COMPANY 2301G N. 11th St., St. Louis, Mo.

(In Canada: 444 Pacific Ave., Toronto, Ont.)



Precision made in 15 standard sizes, or to customers

specifications. Write, wire for detail data.







BOMB FUSE PARTS FASTENED WITH TWO HAND TRIP. Staking machine for fastening parts for a bomb fuse, can only be operated by pressing two levers. The tool head will not lower unless the girl operator has both hands on the levers out of danger. Together the levers are known as a "two-hand-trip".

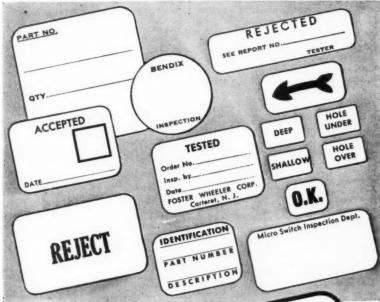


GLASS PLATE GUARDS EYES. glass guard installed over the air blower

INSPECTION STICKERS
REJECTION STICKERS
IDENTIFICATION STICKERS
INSTRUCTION STICKERS

MAGIC KUM-KLEEN STICKERS STOP ERRORS, SPEED PRODUCTION

Simply press on—no moisture required—adhere to any smooth surface (can be applied directly to products in production)—never pop off—yet are easily peeled off.



Magic Kum-Kleen Stickers won't pull off like string tags, fall off like wet stickers, rub off like chalk marks, pull out like pins.

Write today for free samples.

AVERY ADHESIVES, Dept. MTBB-3, 451 East Third Street, Los Angeles.

In Canada, Enterprise Sales & Distributors, Toronto.



BROACH TYPE KEYSEATER The Reading Bench Machine does not re-

Machine does not require bushings or guides. No other machine like it.

Very fast Capac-

ity from a to a cutter.

Low first cost—
prompt delivery.

Good dealers wanted.
READING MACHINE CO.

READING (CINCINNATI) OHIO





Keep Valuable Operators!

for big-wheel Carbide Tool, Surface and Disc Grinders, Sanders, Cut-Offsgets all the dust. Keeps valuable operators happy. Quickly installed. LOW priced. Write for Bulletin A-100. See DUSTKOPS in operation. Booth 120, A.S.T.E. Exhibition, Milwaukee.

A GET-DETROIT CO.
2042 Book Bidg. CAdillac 2000 Detroit

MARKING & NUMBERING
MACHINES HELP YOU
DO A GOOD MARKING JOB.

Wrise for latest catalog.
CONSULT OUR MARKING
SPECIALISTS ABOUT AMY
MARKING PROBLEM.
THE ACROMARK

SIS Marrell St. Elizabeth, N. J. AST APPONENTS

protects the workman's eyes from flying metal chips, at a Westinghouse war plant producing tank equipment. Air under pressure is used to clean the metal frame of scraps and chips after it has been machined.



NO CHANCES TAKEN. Workman's hands cannot be caught under the 150 ton force of this double action draw press, now turning out parts for ordinance materials. The press will not operate unit workman releases a specially installed safety handle with his left hand and then swings a starter with his right hand.

Conserving Steel Plate

A highly efficient method of conserving steel plate stock, and at the same time increasing the number of segments cut from it, was recently suggested to the General Electric Co., by Spencer K. Fredericks, a G-E welder. Spencer's method involved changing the arc length and rearranging nesting of the templates of segments cut from large rectangular sections of 1-inch and 1½-inch steel plate stock.

By reducing the arc lengths of the segments from 90 to 60 degrees, and by arranging the templates crosswise rather than lengthwise on the plate stock before cutting, the amount of scrap left from the operation is great-

"Standard" Rotary Swaging Machines

"Standard" Rotary Swagers are being used in many war plants for attaching rifling bands to shells. A special high speed fixture makes it possible to greatly increase output. The swaging method not only improves the physical characteristics of the band but saves vital material. Swagers are also used for every need from reducing the diameter of tubular and solid bar stock into cylindrical.

conical, or "necked" shapes to swaging connections to cable, conduit, and hose,

- Variety of feeding fixtures. manual, air, and hydraulic operated, can be supplied.
- Available complete in range of sizes for handling solid stock from 1/4" to 33/4" diameter!
- · Engineering recommendations covering your particular job.

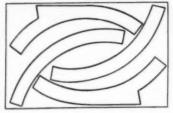


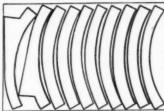
Motor driven "Standard" Swaging Machine with quick acting door clamp, safety guard around flywheel and foot brake.

Write for

Catalog SM-A new 20-page illustrated Swaging Machine Book-Address-

Standard Machinery Co., Pro







Reg. U.S. Pat. Office

TAPS

High Speed Steel Hand & Machine Screw Taps

Cut Thread; Commercial and Precision Ground Thread Taps, Special Taps. Clean, Sharp Threads for

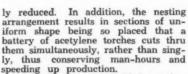
High Production

Write for Catalog
on company letterhead
- BUY MORE BONDS -

HY-PRO TOOL CO.

481 Mt. Pleasant Street,

New Bedford, Mass.



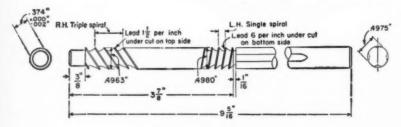
These segments are welded together to form large motor frames. On a recent job requiring the cutting of sufficient segments for 72 large motors, the new method effected a saving of 20 per cent in scrap over the former method.

Straightening Holes Preparatory to Honing

Straight holes in which the axis is not permitted to be bowed more than 0.0001 in 4-inch can be obtained with a fast spiral reamer developed by Howard Fancher, a methods man at General Electric's Schenectady Works.

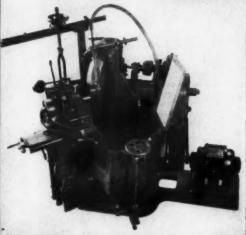
The reamer enlarges the hole approximately 0.002 inch. It is especially useful in producing straight holes thru which rows of cross holes have been drilled.

The tool can be made easily, its cutting edges hold up well, and sharpen-



The Grinder Cut.
Keeps em Cut.
The Girl All
Peleases a Meleases a Meleases a





SELLERS HEAVY DUTY TOOL GRINDING MACHINE SHOWING CENTRALIZED CONTROLS

The Sellers Heavy Duty Tool Grinder is a versatile, high production precisior grinding machine for the modern too room. It will grind any cemented carbid or high-speed steel, straight or convex curved faced tools, including thread tools at any angle of thread or pitch, interna or external, and will accurately reproduce the desired angles and clearances on al the tools. It effects savings in tools by removing the minimum amount of too material, in production costs, by producing the exact shapes required to maintain high cutting speeds and in grinding time by more rapid shaping and sharpening.

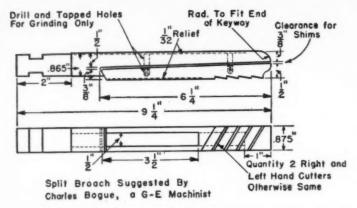
The simplicity of even the heaviest of the Sellers Tool Grinders and the accuracy with which it reproduces the exact shape rake, and clearance angle at the cutting edge make it possible for women operators to keep up with the requirements of the busiest tool room, thus releasing men for skilled machine work or for the armed forces.

Sellers Tool Grinders are thus doing double duty on the production front.

WILLIAM SELLERS & CO., 1616 HAMILTON STREET, PHILADELPHIA, PA.



Sellers



ing is not difficult. The left-hand spiral flutes are shaped like a buttress thread. One-, two-, and three-flute reamers have been used.

The lands are interrupted by a righthand triple-spiral flute with 1½ threads per inch. The lands are not relieved and it has been found that up to 0.012 inch width of land is permissible.

The radial face of the left-hand spiral flutes is toward the starting end of the reamer. This space is ground with a 5-degree positive rake. Only ¼-inch of length of the reamer is straight and to the required size. The next 2-inch portion is tapered 0.0017 inch smaller toward the starting end. The next ¾-inch portion is tapered 0.0003 inch smaller to the starting end of the reamer.

Both straight and tapered portions of the reamer are cylindrically ground. The fluted shank, which acts as a back pilot or guide, is cylindrically ground 0.0005 inch smaller than the finish diameter of the reamer teeth. The flutes in the shank facilitate flow of cutting oil to the reamer.

For a reamer in the neighborhood of ½ inch in diameter, a left-hand thread of six threads per inch, and a triple right-hand thread of 1½ threads per inch have been found satisfactory.

Solving Chip Damage Problem

"A split broach" suggested by

Charles Bogue, a machine operator at General Electric's Schenectady Works, overcomes difficulties encountered in broaching a blind keyway in a shaft and coupling to a tolerance of 0.0005 inch.

Initially, a two-faced broach was developed for the job, one side having right-hand and the other side left-hand special teeth. The opposing angles of cutting equalized the strains and facilitated a straight cut. A space was left at the tip for the accumulation of chips which could be blown out after the broach was withdrawn.

However, it was found that chips from the back teeth damaged the front teeth as the broach was withdrawn, and a new broach had to be used after about a dozen cutting operations.

The broach suggested by Bogue has its shank machined to the size of the keyway, with one side cut away to accommodate a broach face. At the end of the cutting operation, this shank is withdrawn, leaving the broach face loose in the keyway for easy removal. Two passes must be made to cut each keyway, but there is no damage from chips in removing the broach, and deterioration is negligible. By regrinding the teeth and placing shims between the broach and the shank, the tool may be used almost indefinitely.

Attention Gage Users!

IMMEDIATE DELIVERY



WESTERN



to the forms on head bessel, which one fearing agreed in

TO ALL GAGE USERS
YOU ARE OFFERED IMMEDIATE DELIVERY
FROM COMPLETE STOCK ALL MODELS ALL
SIZES AGD ADJUSTABLE SNAP GAGES STOP
ORDERS SHIPPED WITHIN 24 HOURS
THE SHEFFIELD CORPORATION

HOW TO ORDER

State Frame Model and Frame Size. Stipulate whether gage is to be set and sealed. Give complete marking instructions if set and sealed. FOR SPECIFICATIONS

SEE SHEFFIELD HANDBOOK

No. 42-2

PAGES 150-153

THE SHEFFIELD CORP

DAYTON, OHIO.

CORPORATION



HITLER WANTS YOUR SCRAP

TO REMAIN IDLE

Hitler wants you to believe that scrap metal is no longer needed. He wants you to say — "I can't spare the time or men to clear this junk out." He wants to win the war!

And you're helping him to win it if you fail to round up your scrap and get it into the fight. You're dooming some brave American fighting men to die defenseless because a lack of scrap iron and steel deprived them of the weapons they need.

Don't rest on what you've done in the past. The experience of your fellow businessmen proves that you're never cleaned up in the first drive. There are thousands and thousands of tons of valuable scrap lying around in plants and shops of men who think they have already done the job.

Start now to carry on an organized scrap collection program. Apply the

WHAT IS DORMANT SCRAP?

Obsolete machinery, tools, equipment, dies, jigs, fixtures, etc., which are incapable of current or immediate future use in the war production effort because they are broken, worn out, irreparable, dismantled or in need of unavailable parts necessary to practical re-employment.

FOLLOW THIS RULE

if it hasn't been used for three months, and if someone can't prove that it's going to be used in the next three—sell it's or serap it!

*Scrap and used equipment dealers pay well for usable machinery and materials. ruling given in the box to every idle piece of metal on the grounds. Form a Salvage Committee and select a high executive as Salvage Manager. Choose a man who has authority.

If some of the material you find is still usable, sell it as such to your scrap dealer, or a used machinery dealer; it will bring higher prices than the scrap. Write to this magazine for help with this problem, if necessary. Find a scrap dealer by look-

ing in the classified telephone book they are glad to get the kind of scrap you have to offer.

Above all . . . act now! The steel mills must have heavy scrap to mix with the light, household scrap collected last Fall. That is where the big shortage now lies. Do your part to keep our fighting men fighting . . . and winning!

BUSINESS PRESS INDUSTRIAL SCRAP COMMITTEE Room 303 Empire State Bldg., N. Y. C.

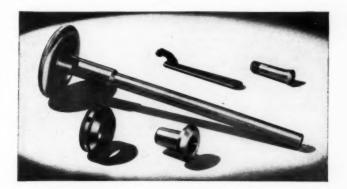
If you have done a successful salvage job at your plant, send details and pictures to this magazine.

SEND FOR PRIMER OF INDUSTRIAL SCRAP TO HELP YOU TACKLE THE SALVAGE PROB-LEM

Rusiness	Press Industrial Scrap Committee
Room Please	303 Empire State Bldg., N. Y. C. Send a Primer of Industrial Scrap
	Name
Company	Name

Handwheel Draw-in Collet Attachment

FOR CHUCKING PRECISION SMALL DIAMETER WORK



The most precise of all types of chucks. Unmatched for small diameter precision work, particularly the manufacture of small tools and parts. This draw-in collet chuck attachment consists of one-piece steel handle and draw-bar; nose-piece (1½"-8 thread); sleeve of tool steel hardened and ground for wear and accuracy; and spanner wrench. Fits the 10" Atlas, 9" So. Bend Workshop and 10" Logan Lathes. Less collet, \$25.00 FOB, N. Y.

1/16" to ½" round collets sized in 8ths, 16ths, and 32nds—3C Hardinge and 3SB Rivett collets. (When ordering, state bole size of collet desired each \$3.75 FOB, N. Y.

IMMEDIATE DELIVERY!

Attachments for other makes of bench lathes available from factory stock. Specify manufacturer and the serial number. Prompt attention to your order assures reasonable delivery.

CENTER TOOL Machine Shop Equipment CO. 153 CENTRE STREET, N.Y.

New Tools and Equipment

Le Maire Crankshaft Machine

THE makers of crankshafts should be particularly interested in a new machine announced by LeMaire Tool & Mfg. Co., Dearborn, Mich. It was designed especially for those whose total volume of shafts produced, altho large, might be made up of several different models requiring many short runs of various setups.

It is a machine for drilling, reaming, and tapping holes in flanges of crankshafts, and is regarded by its manufacturers as a compromise between a single spindle setup and one having fixed spindle drill heads, in addition to individual fixtures for various models of crankshafts to be machined.

Three horizontal spindles, 120 degrees apart, can be spaced on any bolt circle diameter from 5½ to 10 inches. By indexing the head in which these

spindles are mounted, it is possible to drill flanges having 3, 6, or 12 holes.

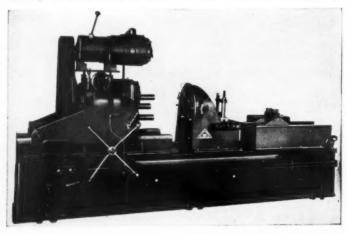
For drilling and reaming, movement of spindle head is controlled by hydraulic circuit, which allows rapid advance, coarse feed, fine feed, and rapid return.

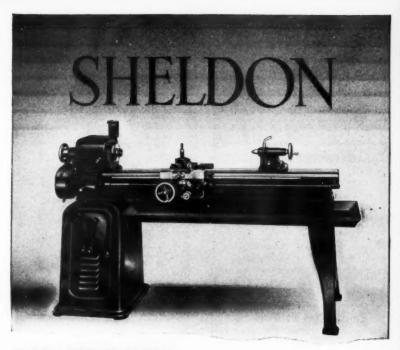
For tapping, the hydraulic cylinder is disconnected and taps are fed into work by manual control. Taps are reversed by limit switch when the slide has moved the required distance.

A 4-speed transmission providing a wide range of useful speeds for drilling and tapping is offered.

The 3 operations, drilling, reaming, and tapping, can be performed with one setting.

Spindles are driven thru a cluster box, with connections to gears made by universal joints. This whole spindle drive is carried in a drum, rotated



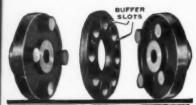


Sheldon BBU-1242 WQ Precision Lathe

This quality 12 in. ball bearing tool room lathe is built for precision work and will retain its accuracy under long and hard usage. It has extra collet capacity (to 1° round), the finest precision ball or roller bearings obtainable, an improved heavy-duty, double wall apron with power cross feed; full quick change gears and full bowl headstock. Its improved Sheldon 4-speed, V-belt, lever-clutch operated, underneath motor drive is entirely enclosed in the pedestal leg and has anti-friction bearings. It is so designed that spindle belts operate thru a standard I-piece bed. This bed is bridge-braced with heavy cross girts and has hand scraped ways—2-V ways and 2 flat ways.

If interested in 10", 11" and 12" quality lathes be sure to see the SHELDON.

SHELDON MACHINE CO., INC. 4242 N. KNOX AVE. CHICAGO, U. S. A.



A MONEY SAVER

The BUFFER-SLOT COUPLING lengthens the life of your Motor-Driven Machines by absorbing the load shock and constant vibration that gradually wear out machinery and bring on shutdowns and repairs.

BUFFER-SLOT COUPLING

It not only gives you all the advantages of the ordinary Flaxible Coupling but if goes a step further and restores that cushion driving torque lost when you discardod Belt Drives. It is long lived, dependable and especially adapted for use with machinery having Ball or Babbitt Bearings.

SEND FOR BULLETIN No. 24-B

BROWN
ENGINEERING CO. PAGE ADING PA

HAMILTON

SWISS TYPE

GEAR HOBBERS

... for Accuracy and speed in hobbing PINIONS GEARS and SECTORS

TWO MODELS

No. 00 SPUR GEAR HOBBER (Illustrated) for work up to 2° diam.

No. 1 SPUR and SPIRAL GEAR HOBBER for work up to 6° diam.

Write for further details to

TRIPLEX MACHINE TOOL CORP. Exclusive Sales Agents

125 Barclay St. New York, N. Y.



Manufactured by
The Hamilton Tool Co.
Hamilton, Ohio

by a worm and worm wheel and provided with an index plate locked by a shot bolt.

Right hand end of machine is equipped with a fixture with removable adaptors, Vee-blocks, and drill plates, which can be set up to accommodate various models of crankshafts.

Arc Welding Is Spectacular

Arc welding is spectacular as well as one of the most useful arts in America's war effort, as this unusual photograph supplied by Lincoln Electric Co., testifies.



The welder is fabricating a massive steel pedestal at the Bentley Weldery, Inc., Syracuse, N. Y. The sparks are given off as the intensely hot electric arc fuses the metal.

This is one of the thousands of welding operations that is helping to speedup war production—the production of cargo ships, warships, submarines, tanks, tank destroyers and other munitions of war.

Welding, for example, has helped to reduce the construction time of a cargo ship from 200 days to 111 hours, and helped the United States turn out as many as four cargo ships a day.



The WYCO No. 5 Hole and Washer Cutter is a Heavy Duty Tool for production work. Cuts clean, round holes or washers not only in sheet steel but in heavy steel plate up to ½" thickness. Quickly adjustable for diameters from 4½" to 10". Can be used in and increases hole cutting capacity of any heavy drill press. Has two standard High Speed cutting off blades for balanced cut and has ½" hardened pilot pin. Stanks are interchangeable. Comes complete with ¾" Hexagon shank to fit any 1" Drill Chuck. Also available equipped with No. 3 or No. 4 Morse Taper Shanks at \$37.50 and \$39.50.

WYCO Flexible Shaft Machines and Wyco Tools are the achievement of over 30 years production experience and engineering ability. They have been designed and built for ever-dependable service to the varied needs of war industry. Today they are doing an efficient job in aircraft and armament plants. Tomorrow you will want them in meeting the production problems of a new era.

Ask us about WYCO Flexible Shaft Machines, Aviation Flexible Shaft Tools, Replacement Shafts and Angle Drilling Heads.

WRITE FOR CATALOG TODAY

WYZENBEEK & STAFF, Inc.

839 W. Hubbard St.,

Chicago, U.S.A.

No. 2½ Hole Cutter for electric drills, drill press, or brace. Complete with bits and hardened pilot pin.

No. 2½ adjustable

No. 4½ adjustable

134" to 4½"—\$2.50

No. 4½ adjustable

134" to 4½"—\$4.50



No. 1-F and 2-F Fastermatic Turret Lathes

Maximum production with minimum of man hours is claimed for the new No. 1-F and No. 2-F, announced by International Machine Tool Corp., Foster Div., Elkhart, Ind.

Since the entire machining cycle is automatic and operator need only concern himself with loading and unloading work, he is thus able to attend to several machines—an appreciable saving in manhours.

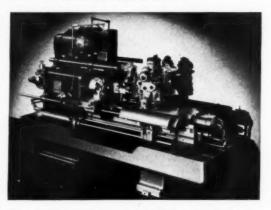
Fastermatics are equipped with a flexible hydraulic feed system which provides an

tem which provides an independent feed for each face of turret. No time is lost in changing over from one cut to another. Frequently, the same tools may remain in the turret and simply reset for the particular work in hand. Standard tools are available for most work. Standard cams, adjustable to control various movements or change operating speed are provided.

The hydraulic feed unit is built into machine and pump operating the controls is mounted inside bed. It is driven by a double solid roller chain from main drive shaft. Coolant pump is also driven from this shaft. The Oilgear Unit supplying the oil pressure, which controls all feeding operations is also mounted in bed below headstock. Oil pressure adjustable from 300 to 1000 lbs psi is provided and rapid traverse pressure of 300 lbs psi maximum is adjusted at factory.

Clean oil, free from abrasive particles, is assured in the hydraulic control system by an oil filter provided with convenient cleaning facilities. Ample power for hydraulic feed of entire machine is provided by one large powerful hydraulic cylinder mounted at end of bed.

Motion of the hexagon turret slide provides the necessary feed to front



and rear cross slide by means of cams. Forward and reverse movements of hexagon turret slide indexes hexagon turret and cam roll.

Operation of facing heads, mounted on hexagon turret, is provided by means of an hydraulic cylinder carried beneath cross slide at rear. This is an optional standard attachment. Timing of this cylinder in relation to hexagon turret face corresponds very similarly to method of timing operations on standard cross slide. Valve opens just at the time hexagon turret reaches end of its forward movement and the piston in main cylinder is at rest against front end of main cylinder.

Reverse movement of this cylinder is controlled by means of an adjustable rod mounted below cylinder and thru a bell crank attached to shaft. As the cut is completed, valve is automatically shifted causing cylinder to assume its starting position. Adjustments are provided to set machine for a wide variety of cross facing operations.

The 1-F has a range of 27 spindle speeds from 22 to 332 rpm. arranged in 9 sets of 3 automatic changes

The 2-F provides 28 spindle speeds from 17 to 263 rpm. arranged in 7 sets of 4 automatic changes. Higher speed ranges may be supplied when required.

OTHER INSTRUMENTS IN THE SCHERR LIMITED BUDGET INSPECTION LABORATORY



SCHERR COMPARITOL—for checking gage blocks, gages and work for size, accuracy and wear. \$195.00



ATLANTIC ADJUSTABLE LIMIT SNAP GAGES—for accurate checkup, without having to depend on operator's skill. Sizes to 6".



MAGNI-RAY—a wide field illuminated magnifier for close inspection of work and operations. \$18.50 List.



SPENCER BINOCULARS — for detecting surface finish, imperfections, etc., by means of 3-dimensional vision. \$143.50.



ULTRA-CHEX—a 34 block set accurate to .000008" and providing a basic standard of measurements. \$125.00. Iminate guesswork
Insure ACCURATE INSPECTING and

WITH THE WILDER PROJECTOR

Price \$250.00

This instrument—at a price within the reach of any shop—is an optical device for measuring or comparing objects by means of a magnified image both in transmitted or reflected light. It provides a simple, accurate method of

- ... checking tools and gages to eliminate errors at their source.
 ... inspecting and measuring tool work, pivoted work and small screw machine parts of all kinds.
- screw machine parts of all kinds.

 ... verifying tool settings by checking first parts produced.

 ... controlling tool wear through periodic inspection of work.
- ... inspecting finished product.

One of the most useful applications of the Wilder Projector is that of checking threads. By means of this instrument it is possible to detect inaccuracies which cannot be seen with the noked eye nor felt by go and no-go thread plug and ring gages. Low initial cost will be repaid over and over again in savings from the prevention of spoiled work, which results from the use of this instrument.

Easy to operate, simple and sturdy in construction, the Wilder Projector offers many opportunities to speed up measuring, checking and inspecting.

CONDENSED SPECIFICATIONS

Standard Magnifications—10x to 100x Space occupied in bench—21"x24" Height over bench—18½" Depth below bench—20" Size of screen—10½x16"
Size of cross slide stage—6"x5"
Capacity between centers—5"
Maxmium swing of centers—2½"

Write, wire or telephone (Canal 6-3512) for further details, auotations and delivery dates.

GEORGE SCHERR COMPANY, INC. 122 LATAYETTE ST., NEW YORK, N. Y.

In operation, buttons engage ratchets which cause valve to change to a different position with forward movement of hexagon turret, thus causing oil under pressure to shift a clutch in headstock to make a speed change

The 1-F is furnished with 7½ or 10 hp motor while the 2-F uses a 10 or a 15 hp motor. The motors are standard 1800 rpm type and maintain a drive shaft speed of 1040 rpm.

Headstock and pick-off gears are of

the helical type.

A powerful multiple disc clutch acts as a spindle brake when spindle control lever is shifted to left.

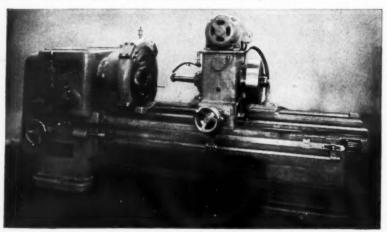
Facing, cut-off or forming operations are simultaneously performed with the hexagon turret which is provided with two slides, one at front and one at rear. These are individually controlled and feed rate is determined by the angle on the cam and rate of feed of hexagon turret slide. Standard or special tool blocks may be mounted at any desired position on slides to accommodate the work at hand.

Where large quantities of one particular part are needed, which can be completed at one pass of tools, slides may be supplied. In event of change of design, machine may be retooled and adapted to production of the newly designed parts.

An additional advantage of both the platen type and standard metal Fastermatic, is that the cycle can be interrupted at any point and tools retracted sufficiently to correct any unexpected trouble such as an improperly chucked, broken or burned out tool or any other unexpected trouble. A single lever movement interrupts feed and permits trouble to be remedied. Cycle may then be resumed at point of interruption.

A cross facing unit is available as a standard tool for performing various cross facing operations. Special tool holding blocks with cutting tools may be located at the desired position suitable for the work and adjustable stops are provided on slide to maintain duplication of accurate dimensions.

By means of a special bracket and cam, a standard cross facing attachment may be used for facing tapers of more than 45°. Angles of less than 45° may be turned by mounting a cam at end of facing slide.



Morey Shields Internal Thread Milling Machine with special fixture for machining propeller hubs. The machine can be used for other similar work.



Immediate Delivery

For the first time—a complete set of High Speed Keyway Cutters handily packed in a serviceable, well constructed box. Saves time in selection. Saves the cutting edge in storage. All sizes from "201" to "G". No extra charge for container. Special sizes made to your blueprints.



High Speed R.H.Spiral

Single or Double END MILLS—2 or 4 Flute, up to 34" Double End—78" Single End.



High Speed Center Drill

FastCut Combined Drills and Countersinks
Both in Standard & Bell (Safety) Type Center Drills
Special Sizes and Angles Made to Order

Catalogue Sizes at Standard Prices

ASH & COMPANY

Cutting Tools—Factory Supplies

3939 Grand River, Dept. B

Phone Temple 2-6363

Detroit, Mich.

Moore Jig Borer



The Moore Jig Borer, manufactured by Moore Special Tool Co., Inc., of Bridgeport, Conn., and distributed by Marburg Bros., 90 West St., New York City, features a fundamental method of coordinate location for direct-reading. By means of 2 precision lead screws, working at right angles to each other, work-piece may be moved into any desired position in relation to the fixed spindle. This, says the maker, permits accurate spotting, drilling, reaming and boring in one uninterrupted sequence.

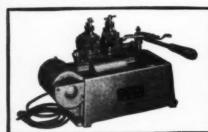
Easy to operate, the machine, it is pointed out, is unusually adapted to the needs of toolrooms and jobbing shops, making tools and dies for such complex products as aviation instruments, mechanical time fuses, clocks, locks, electrical devices, typewriters and other small, moderate-sized parts. It is sensitive for holes 1/32" or smaler, and rugged for its maximum eapacity, viz:—2-speed motor—tool steel, 3½", soft steel, 4½"; single-speed motor—tool steel, 2", soft steel, 2½".

Lead screws are corrected and checked under actual working conditions and said to be exceptionally accurate. Accuracy from any one inch to the next is said to be within the limit of .00005". Spacing and boring of holes is claimed to maintain accuracy within limits of .00025" in any position of table, inclusive of any possible error in squareness of the compound table which is squared to less than .0001" in full length of travel.

Smith Speed Reducers

An attractive 24-page brochure—
"There's More Than Meets the Eye...
in Speed Reducers," covers the Smith
background and the physical extent
of this manufacturer's facilities.
Whereas the regular catalog sells the
product, this new booklet sells the
company behind the product. Numerous large photos show the shop production equipment, described with a
minimum of text.

For. a copy, address Winfield H Smith, Inc., Springville, Erie Co., New York.



BAND SAW WELDERS

The No. 141 Bench Type Metal Working Band Saw Welder is available with or without grinder. Work can be annealed without removing from the Welder. Band saws up to ¾4 wide may be welded.

I KVA-110 Volt-60 Cycle-single phase-5 point heat control-1 point anneal heat— Weight 40 lbs. Let us send you further details.

Mfrs. of complete line of Spot, Butt, Seam, Flash, Projection and Special Welders.

WELDEX INC., THIS MODONALD AVE., DETROIT, MICH.



FASTER ON 8 DIFFERENT OPERATIONS





- 1-chamfering
- 2 -rounding 3-squaring
- 4-forming radii
- 5-grinding flat surfaces 6-grinding parallel surfaces
- 7-polishes 8-removes shaper marks

PORTER-CABLE Wet-Dry BELT SURFACERS

for Speeding Tool Room Jobs

Just present the work to the abrasive belt, and this amazing new surfacing method chamfers, rounds, squares, forms radii, grinds flats and parallels, and secures high polish. All with an ease, precision and rapidity that makes this Porter-Cable machine do close-tolerance operations in seconds what would normally require minutes. Used free-hand or with simple fixtures, it eases the load on hard-pressed millers, planers and shapers, handles more jobs, in greater variety, in a clean, dustless manner, at savings which quickly offset the costs of the machine.



300-3 Exchange St., Syracuse, N.Y. 5 to 50 Times Faster in Production!



Even unskilled workers find Porter-Cable Belt Surfacers (Model G-8) easy and safe to use. Release pyour skilled workers for more important jobs. Call the local Porter-Cable man (see classified 'phone book), or write for our new booklet showing the many applications of belt surfacing.

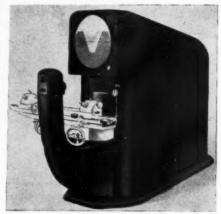


Universal Optical Comparator

A new Model P-3 Universal Optical Comparator, developed by the Portman Machine Tool Co., 17 and 19 Beechwood Ave., Mount Vernon, N. Y., is said to offer may advanced features of unusual importance at this time.

It covers a wider range of work and incorporates in its design, a scientifically correct optical lens system. The large mechanical working capacity makes it possible to handle parts of such size as were heretofore considered beyond the range of optical inspection apparatus.

The wide field of the objective lens units and the superior light obtained with the microphotographic bulb a re said to permit projection of clear, large images with sharp outline definition and uniform light coverage over the entire screen area. Lens



units are available to provide magnifications for 10X, 25X, 31¼X, 50X,





for ACCURACY—LONG WEAR

ACCURACY PLUS ATTRACTIVE DELIVERIES ON YOUR ROUND WORK NEEDS

Accuracy we have made possible for you by combining thorough engineering and expert workmanship with relentless inspection.

Attractive Deliveries are assured you through special tooling equipment we have devised, plus our long experience in the manufacture of special cutting tools to customers' blue prints.

Send us your inquiries on round work needs—for prompt estimates.

WARREN

INDUSTRIES

26667 Mound Road,

Warren, Mich.

Dependability in WORKMANSHIP and DELIVERY

62½X, and 100X. Special lens units having higher magnifications can also be obtained.

The Comparator is of exceptionally rugged construction—a feature of the utmost importance in apparatus of this kind particularly where there is vibration from adjacent machinery.

The universal type stage enables operator to place work in various positions and offers flexibility of movement in all directions. The stage travel measurement control devices are of unique design, permitting precise readings to .0001" over the entire range. These measurement control devices are included as standard equipment and take care of readings in all directions. A graduated protractor screen is also included.

Mechanical specifications:—Distance between centers—12½"; vertical measuring range—8"; horizontal measuring range—8"; work screen diameter—18"; vernier reading on screen—360°; work table dimensions — 6 x 24"; angular setting of stage to 22°; height 72", width

34", depth 72". Approximate shipping weight—1500 pounds. Extra accessory equipment available includes adjustable center supports, surface illuminators, and right angle work holder.

Details Aircraft Tools

Presenting its series of tools for the production lines of war, Aero Tool Co., Burbank, Cal., files its answer to today's critical challenge of "Give us the tools, we'll do the job!"

Claiming "years - ahead" design, fundamental requirements for each tool are stressed as accuracy, applicability plus features emphasized as exclusive. Among the latter: cupforged design for uniform grain structure and metal flow, high wear-resistance and resilience; microglass finish, to prevent marring; comparator inspection to assure surface perfection and dimensional accuracy.

The full line is presented, elaborately detailed and illustrated, the firm pointing out that the tools are in stock, awaiting delivery.

AMERICAN MEASURING INSTRUMENTS CORPORATION

Announce their removal to:

240 West 40th Street New York City

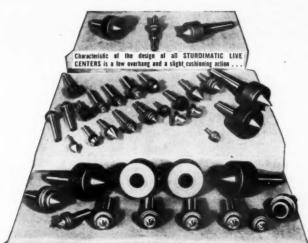
where augmented facilities, efforts and skills will be, as in the past, at the disposal of their clients.

American Measuring Instruments Corporation
240 West 40th Street New York City

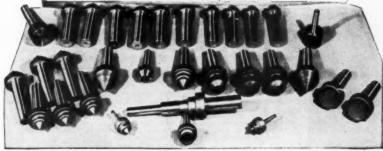
Manufacturers of Indicating Gauges, Plug Ring Snap Gauges, Jigs, Fixtures, and Measuring Instruments.



AMIC PRECISION INDICATING CAUGE



that compensates for expansion due to heat, shock and excessive thrust leads—reducing wear to a minimum. A prayorly engineered live center is one of the fundamentals of setting up a job and requires a specialist's experience — the control of the



Send us your specifications and blueprints—We will see that your job is set up with the right LIVE CENTER—prompt deliveries on high priorities.

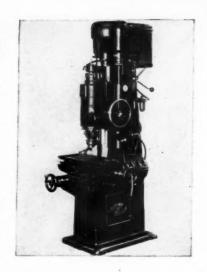
TOOL COMPANY 5224 THIRD AVE. DETROIT, MICH.

Moore Jig Grinder

Recently developed by Moore Special Tool Co., Inc., Bridgeport, Conn., is this jig grinder for finish-grinding holes to size and location to meet the increased accuracy demanded in sheetmetal stampings and various other types of tool work. Marburg Bros., 90 West St., N. Y. City, are sole distributors.

The makers estimate that die life can be increased from 25% to 100% by relocating and finish-grinding holes after hardening, because finish is smoother and decarbonized surface of the steel is removed. More uniform clearance between punch and die is said to result.

A machine tool new to tool-and-die practice, the Jig Grinder is so named because of close connection to the Jig Borer. It is claimed to grind holes, straight or tapered, within .001" on dies, drill jigs, masterplates and precision gage parts. Tapered holes can be ground in either direction up to 11/2



POSITIONERS - the capacity you need the features you want Not only for the welding you are doing today, but for the increased amount of welding you will do in the future, you will want C-F Positioners. 1. Because "position welding" is generally specified now. 2. Because the C-F Positioner Line provides the exact size and type

positioner needed for every shop.

3. Because C-F Positioners have the special design and operational features which make them universal tools—adjustable height pedestal and boom-type bases that increase tilt and operator and floor clearance; manual, motor or variable speed controls, greater capacity for rating etc.—features that assure efficient handling not only by today's job but of tomorrow's as well.







UNLIMITED PEAK PRODUCTION

Much larger die space than average presses. Engineered and designed for unlimited peak production.

Reinforced construction at points of greatest wear.

If you want the best, send illustrated catalog describing complete line TODAY.

42 YEARS ENGINEERING EXPERIENCE BUILT INTO EVERY JOHNSON PRESS USED BY LEADING MFR'S, THROUGHOUT THE WORLD.

JOHNSON MACHINE AND PRESS CORP.

ELKHART, INDIANA

With Modern

degrees on each side or 3 degrees included angle.

Previous to development of this machine, correcting position of holes after hardening was a costly, highly skilled and, at best, rather makeshift process. For example, holes in a multiple-station die would have to be ground one section at a time, including all of the laborious steps of centralizing, locating, indicating, grinding, re-assembling and checking. With this tool, all sections, it is said, can be screwed and doweled into place, put on the machine and ground in one setting, depending entirely on the Jig Grinder for location.

This is claimed to eliminate hours of checking and measuring on bench and surface plate, where the die-maker, under the best of conditions cannot possibly work as close as the Jig Grinder. The latter machine, with semi-skilled operators, is said to do the job in a fraction of the time required by any other method.

The Jig Grinder has capacity to grind holes from .030 to 4", accuracy of screws of .00005" per inch, and grinding speeds of 15,000, 25,000 and 45,000 rpm. A new bulletin gives full details and specifications.

Welding and Brazing Aluminum

A new rewritten edition of "Welding and Brazing Alcoa Aluminum" is announced by the Aluminum Company of America, Pittsburgh, Pa.

The booklet is a very complete and comprehensive 100 - page textbook. There are many large illustrations, showing just how typical jobs are handled, and the accompanying text is very explicit. The many phases of gas, are and resistance welding are discussed. Also seam and flash welding. The final chapter is devoted to brazing.

The book is interesting and authoritative, and it will be sent without charge.





FAST—PRACTICAL MORE POWERFUL!

Madison-Kipp tool makers originated the first really high speed grinder. They know a great deal about the practical side of grinder design and grinder usage. They think the new Model H is the best all around off-hand tool agree with them. It's fast (50,000 R.P.M.),more powerful, and has a handler grip. ORDER TODAY!



MADISON-KIPP CORP. 207 WAUBESA STREET MADISON, WISCONSIN

ABRASAW-

BRIDGEPORT NO. 47W WET CUT-OFF MACHINE



More, better and cheaper cuts on practically all materials, are produced by the new Bridgeport "Abrasaw". Cutting speeds are unbelievably fast, material is handled with facility and the polished cuts often eliminate secondary operations.

LET US SEND BULLETIN GIVING DETAILS.

BRIDGEPORT SAFETY EMERY WHEEL CO.

1304 W. BROAD ST. INC. BRIDGEPORT, CONN.

Hydraulic Hand Press

A new high speed straightening press, Model HP-010 has been developed by Anderson Bros. Mfg. Co., 1907 Kish-waukee St., Rockford, Ill.



The design eliminates moving work from anvils to centers for checking. Checking and bending are done in the same position. When pressure is released, the spring tension on rolls brings the work free of the anvils and free to rotate for checking.

Checking rolls are easily adjusted for different lengths of shafting, etc., and can be removed altogether if necessary.

Press comes equipped with an indicator gauge, calibrated in thousandths of an inch for locating high and low

Also included is a pressure gauge calibrated in pounds. The exact tonnage required to strengthen any shaft can be determined by the operator in a short time.

The makers stress the fact that this is truly a high production machine and warrants consideration of any plant with a quantity of shafts to straighten. This first model was built to handle work up to 1-1/2 inches in diameter, but larger sizes will be made to suit the trade's requirements.

The unit is operated by a hand hydraulic pump and has a capacity up

to 20,000 lbs.

Manual on Cranes and Hoists

A new 108-page handbook on Cranes and Hoists has been issued by Shepard Niles Crane & Hoist Corp., Mon-tour Falls, N. Y. Starting with Crane nomenclature, the many types are il-lustrated and described in detail. The pages are 7 x 101/2" which enables attractive presentation of the many illustrations. A vast amount of valua-ble, general information is included.

Fiberglas

The January issue of Wheelco Comments is devoted to a brief history and discussion of the development of the Fiberglas industry. Many of the modern uses of Fiberglas are described. It is published by Wheelco Instruments Co., Harrison and Peoria Sts., Chicago, Ill.

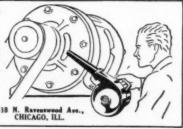
RUST or DUST-TORNADO **ELIMINATES BOTH!**

DON'T be deceived about moist air or dust-they both "get" motors in their vital spots. Eliminate both with the 295 m. p. h. blast of clean, DRY air of TORNADO, the Electric Blower so widely used in industry-for keeping motors fit _cutting repair and power costs.

No installation. No heavy hose to drag or extend. 3 f an hour to operate. 1 h. p. G. E. motor. A real, heavy-duty industrial Blower. Soon pays its cost with its speed, economy and lowering of maintenance costs

Write for details and FREE TRIAL Offer.

BREUER ELECTRIC MFG. CO., 5118 N. Ravesswood CHICAGO, ILL.



LATHE PRODUCTION Will be Increased



WITH THE RECOR LEVER COLLET CLOSER

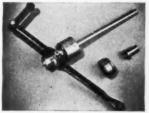


FEED AND RELEASE BAR STOCK THRU THE COLLET WITHOUT STOPPING LATHE

Easily attached to Logan, S. B., Atlas bench lathes having a No. 3 Morse Taper in the head stock. Will feed any length stock from 1/64 to 1/2* through the spindle, but step collets can be made to accommodate larger diameters and used for second operations only. Gripping action is adjustable to desired tension without lose of time. Fhe ReCor Lever Collet Closer is precision machined from finest materials obtainable and will last indefinitely. All parts hardened and ground where necessary. Cam is mounted in a ball bearing to insure smooth running. Write or wire today for details.

RECOR MFG. CO., 430

430 S. GREEN ST. CHICAGO, ILL.



Collet Closer with fittings ready for installation



A DOUBLE - SWIVEL



Dividing Head, with Interchangeable Swivel & Regular Base!

Two Interchangeable bases. One a swivel base, graduated in degrees, when used with chuck or faceplate on spindle, converts milling machine or tool grinder into Universal Machine. When used with regular base it's a 6½ Dividing Head, but may easily and quickly be converted into a 11° Dividing Head — Entire assembly is precision made. Write for illustrated folder TODAY 1

DISTRIBUTORS WANTED-WRITE US FOR TERRITORY TODAY!



REPUBLIC TOOL MF'G. CO.

7722 Maie Ave.

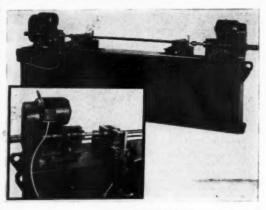
LOS ANGELES, CALIF.

Pines Automatic Centering Machine

At no u ncement is made by Pines Engineering Co., 600 Prairie, Aurora, Ill., of a 2-spindle automatic centering machine for bars up to 6 ft long.

One chuck and one head are stationary on the machine. The other chuck and head are movable for adjustment to accommodate different lengths of bars. For centering pieces from 18 down to 6 inches long, one chuck is removed from the machine. Chucks are both actuated by air cylinders, directly connected thru

a rack and pinion on the screw, for opening and closing jaws. A cam on the lay shaft for advancing the 2 spindles, actuates a 4-way solenoid operated air valve thru a limit switch, closing chucks automatically. Adjustments are provided for aligning chuck jaws with spindles, to compensate for wear.



Capacity of the chucks is a maximum of 5-inch diameter round bars.

In illustration, regularly-provided guard has been removed to show rack actuating mechanism for chuck.

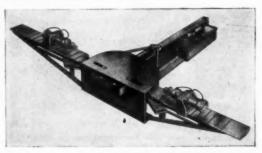
Complete descriptive literature may be obtained from the manufacturer.

Hydraulic Bender-Beveler

A machine designed especially for handling extruded rolled and flat strips many shapes and materials, is announced by Hufford Machine Wks., Redondo Beach, Cal. It is said to operate on a new principle of metal-forming by placing the workpiece under heavy tension while bending around a form block or die. Greater accuracy, speed

and uniformity are claimed for the method.

Bending is done by stretching extrusion between the 2 hydraulic cylinders, and wrapping or bending the strip around die while under tension.



proper initial tension causing the metal to flow into desired shape without wrinkling, making for close tolerances, the firm points out.

Forming dies may be made quickly to approximate shape from hard wood,

PRODUCTION TOO VITAL...

to risk the waste of time and metals because of faulty coolant handling.

Depend on the "assuredflow" of Eastern Coolant
flow" of handle your coolant compound—the flow
starts with the touch of the
"Go" button.



For complete details, write

EASTERN ENGINEERING COMPANY
42 Fex St., New Haven, Conn.



Tough-Sharp Tools

THAT WILL SPEED UP YOUR FINISHING

In scores of America's busiest war plants Yeomans Rotary tools are throwing off clean sharp chips. They are biting into castings in a hurry. They are doing an A-1 job of speeding production of a tremendous variety of metal parts and castings. Yeomans tools—and Yeomans regrinding service for your Burrs, Diesinkers, Reamers, Drills, End-mills and Milling Cutters can help you speed your production. Write today for complete facts.



easily tested and corrected for springback, then faced with steel plate or aluminum alloy. Wooden construction, says the firm, is adequate, for their use replaces metal dies, effecting worthwhile economies.

Bending and beveling can be done at one operation, often in seconds, says the firm. During such operations, material can be on its own normal axis or its cross section can be modified by changing angular reaction between its sections. Production increases of 300% with 30% manpower reductions are claimed by the maker, with complete uniformity of parts.

Tension equally applied over workpiece minimizes localized strains, and work-hardening is slight and uniformly distributed, removing need for normalizing after bending, says the firm.

Specifications: length 12" to 200"; cross section, maximum size 7"7"; cross section area-approximately 3 sq. in. maximum die width from 6" to 120": motor: 10 h.p., 220 or 440 volt, 3 phase; hydraulic system: 2000 lbs. operating pressure; shipping weight: approximately 12,000 lbs.

Firm's literature gives detailed information.

Hydraulic Cutting-Off Unit

Landis Machine Co., Waynesboro. Pa., has recently developed a hydraulically controlled cutting off unit. This device replaces the standard carriage, crossrail, and die head of the Landis Mill Type Pipe Threading Machines where these machines are used strictly for cutting off.

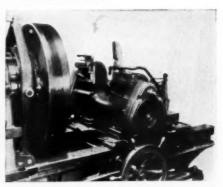
The device comprises 2 high speed steel cutting off tools mounted in massive slides. The slides function thru a hydraulic cycle which provides rapid traverse of tools to work and rapid retraction of tools after cutting off is completed. A single lever controls both forward and return movements of tool slide.

Complete operator control of the hydraulic cycle provides variable feed rates for the cutting off tools and adjustment of travel of these tools for different thicknesses of tubing. justment for rate of feed is made thru a single control valve so rate of feed, for both front and rear cutting off tools will be the same. The cutting off tool slides likewise are adjustable, within certain limits, for various diameters of tubing.

Bliss Horn Press Catalog

Exhibiting the standard as well as specifically-developed line of horn or adjustable bed presses, is a new 2-color catalog by E. W. Bliss Co., 53d St. & Second Ave., Brooklyn, N. Y.

The standard line of presses is given



in the first portion of the book, and illustrated with adjustable beds, tho they are arranged to receive horns and fixtures adapted for hook forming, seamclosing, riveting, cylinder perforating, and other work. Used in conjunction with pneumatic cushions, for riveting, they are generally arranged in horizontal position, says the catalog.

Detailed also are heavy pattern presses, built to specific order and adaptable to wide range of work.

Where large apron area and slides are indicated, to support heavy dies and fixtures, double-crank type presses are available.

Presses are vividly illustrated in duotone (blue-black) and listed with full specifications.

ELECTRIC COUNTERS

Count anything from shadows to box cars - parts, cans, cases, bottles.

Current draw only 4 Watts - 600 counts per minute continuous duty coils - all working parts enclosed.

May be located at any distance from actual source of count. Actuated by any suitable switch, relay, or photoelectric unit.

Built for heavy duty industrial service. Quick deliveries on high priority orders.



users in applying Counters. For suggestions, just tell us what you want to do.



704-14 W. JACKSON BLVD. CHICAGO, ILL. Manufacturers of Counting, Timing and Recording Devices

R SIZES ARE NOW AVAILABLE EDIATE DELIVER



Write for Illustrated Price List

A. G. D. STANDARD ADJUSTABLE LIMIT SNAP GAGES

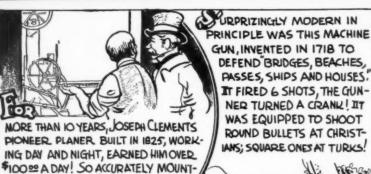
COMPLETE RANGE OF MODELS AND SIZES ATTRACTIVELY PRICED

SATISFACTION GUARANTEED



OUALITY TOOL & DIE CO. NOBLE & VERMONT STS.

Mechanics Through the Ages



ED WAS CLEMENTS PLANER THAT A
PIECE OF PAPER, PLACED OVER
A ROLLER, STOPPED

THE MACHINE!



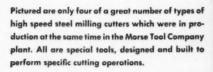
IN THE 1600'S

CALILEO ESTABLISHED THE REGULARITY OF A PENDULUM'S SWING BY NOTING THE OSCILLATIONS OF A LAMP SUSPENDED FROM THE CEILING OF A PISA CATHEDRAL! SO IMPERFECT WERE TIME-MEASURING DEVICES THEN, THAT HE TOOK HIS PULSE TO COMPUTE TIME.



out TYPE OF DUCTION

Designed and Built into every

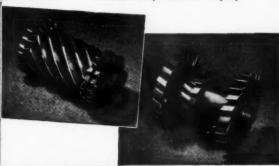


In your production, the requirements for milling cutters may be very unusual. It is in such cases that the experience and facilities of the Morse Tool Company can be of definite value to you. The tools will be made exactly to your specifications or, if you desire, the cutters best suited to your purpose will be designed in our Engineering Department. So that your inquiries for information or quotations can be handled without delay, it is essential that you furnish us with all necessary blueprints.

Complete lines of standard high speed tools are also manufactured by Morse Tool Company.

Among the Products MORSE TOOL CO. SPECIAL MILLING CUTTERS GANG MILLS AND ARBORS

> FORM RELIEVED CUTTERS



Morse Tool Company DETROIT . MICHIGAN

Triple Cleaning Baskets

It is now possible to clean different types of parts individually, and yet run them thru the L & R Industrial Cleaning Machine at the same time. A new triple basket has been devised which fits snugly into the regular work basket (3-% deep x 5-1/2" diam.) of the machine, and being made of fine mesh. will hold minute parts without danger of their slipping thru the mesh and becoming mixed with other elements.



For this type of cleaning, many plants are now employing girls because of their natural aptitude in the care of delicate apparatus and parts. The Machine is extremely simple in its method of operation and female operators take to it quickly, and, in record time, become expert in its operation.

Many plants are utilizing batteries of L & R Equipment and are turning out production quantities of cleaned parts with just a few operators where formerly large trained crews were required. The machines are made by L. & R. Mfg. Co., 54 Clinton St., Newark, N. J.

Foot-Operated Acromarker



Tests in actual production are said to show greater than 25% increases for this Acromarker name plate and parts stamping machine. It is pedal-operated to keep operator's hands free for feed-The pedal feature, available in Acromarker 1943 Models 1, 5 and 7, has proved important in plants marking steel, brass, bronze, zinc, tin, fibre, celluloid, and plastics.

Height has been correctly determined for the average operator, and floor space required is limited to permit installation and use of machine in production lines where most needed.

Adjustment from zero to 34" gives variation for thickness of name-plates and parts to be stamped. Standard die sizes range from 1/16" size and included with each machine is a marking head (any specified size) with a full alphabet and figures.

Maker is Acromark Company, 404 Morrell St., Elizabeth, N. J.

GUN BARREL DRILLS AVAILABLE

1 Pratt & Whitney and 5 Baush gun barrel
drills, double spindle, 13/16" capacity in diameter, 33-%" capacity in length, 6½" swing,
9½" bed. May be used for making gun
barrels, crank shafts, connecting rods, cam
shafts, etc. Address Hitchcock Publishing Co.
588 Sc. Dearbarn, St. Chicarco for farther de-508 So. Dearborn St., Chicago for further de-

ERRINGTON MECHANICAL LABORATORY

MAIN OFFICE AND WORKS: STATEN ISLAND, NEW YORK

Chicago Office: 6422 N. RICHMOND STREET New York Office: 170 BROADWAY



For AIRCRAFT and MUNITIONS

Style D-E. Quick Change Tools



PRECISION WORK IN REARMAMENT

65 Standard Styles and Sizes. Manually operated presses $\frac{1}{4}$ to 35 tons pressure. Motor driven hydraulic presses $\frac{1}{2}$ to 30 tons pressure.

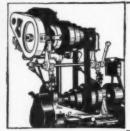
Let us send you our catalog No. F.

GREENERD ARBOR PRESSES

NASHUA

Est. 1883

NEW HAMPSHIRE



Noise is a business error

You get the speeds you need with a Remco Motor Drive without the penalty of high price. Fast, quiet, speed changes. No ear-splitting clash of metal-on-metal. Instead the motor on a Remco takes hold gradually by slipping the belt — simple friction-clutch action. Such keen minded engineering, smarter design, makes Remco the choice of shrewd buyers everywhere. Join them! Remco Products Corp., State St. at R. R., York, Pa.

REMCO MOTOR DRIVES

for LATHES, SHAPERS, DRILLS, MILLING MACHINES, etc.

They "Pass the Ammunition"

According to Army Ordnance 12,600 tons of critical brass is being saved on one contract in the conversion, alone, of 105 mm shells from brass to steel. This development has been fa-



cilitated by the adoption of drawing dies with extremely hard cemented tungsten carbide centers. Produced by Carboloy Co., Inc., Detroit, the 6 sets of four dies each, shown in the illustration, will produce an estimated 1,000,000 steel shell cases.

De-Ion Circuit Breakers

For lighting, distribution and power circuits up to 600 amperes, the complete line of Nofuse De-ion Circuit Breakers is described in a new 40-page booklet.

These breakers are available for panelboards, switchboards, built-in applications, individual mountings and separate enclosures. In the booklet, principles of the De-ion are quenching action are explained, and quick facts are given on design and operation of each breaker.

Special attachments are described, including the shunt trip, undervoltage release, auxiliary switches, and bellalarm switches. The booklet explains how to select the De-ion circuit breaker best-suited for the application, and diagrams are included with exact dimensions of each breaker.

A copy of booklet DD-29-060 may be obtained from Department 7-N-20, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.



BUTTS AND CONTINUOUS LENGTHS — for GUARDS — CABINETS — CASES — BOXES — LUGGAGE
WRITE FOR CIRCULAR

S & S MACHINE WORKS

HARDWARE DIVISION

4830 WEST LAKE STREET

CHICAGO, ILLINOIS

POWERFUL JAWS

with Hair Trigger Speed

WHEN the Fenn Quick-Action Vise takes a grip on a piece of work you can be sure that it is there to stay until released.



THERE'S no slow motion cranking action with a Fenn...it's speed and production. The quick action levers pull the jaws up quickly and hold them tightly and solidly. That's why the Fenn Vises are used by the big plants for small parts production work—milling, drilling, tapping and assembling.

THE FENN MANUFACTURING CO. HARTFORD, CONNECTICUT

The only Air Gun with enclosed lever that operates the valve thru a ball and socket joint.

Patented May 1939

Trouble Free

No packing gland. No external lever.

No external lever. All moving parts enclosed. Instant, positive shut-off.



Leaky Air Guns waste air and reduce pressure. AIR-O-CHEKS save power and avoid troublesome maintenance. Prompt deliveries on high priorities.



Fittings for air and welding hose.

AIR-WAY PUMP & EQUIPMENT CO., 401 S. Jefferson St., Chicago



LATHE CHUCKS UNIVERSAL GEARED SCROLL

Manufactured in sizes from 4" to 15". Solid one piece body construction in semisteel castings.

PROMPT DELIVERY! on 7½" and 9" Chucks.

I. K. ALMOND MFG. CO. ASHBURNHAM, MASS.

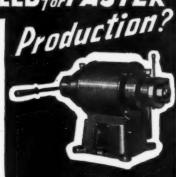
ARE YOU TOOLED for FASTER

USE SCHAUER SPEED LATHES

BURRING - LAPPING - POLISHING - and FINISHING operations of gears, pinions, pulleys and similar parts.

Used by Pratt & Whitney Aircraft, New Departure Mig. Co., Winchester Repeating Arms, GMC, Lukas-Harold Corp., Wright Aeronautical Corp., Army and Navy Stations and many others.

Write for Catalog No. 420





"the originators of today's Speed Lathes"

SCHAUER MACHINE CO

2064 READING ROAD

CINCINNATI, OHIO

CATALOG · Now Ready!



100 PAGES

of information on **47 Speed Reducers** 1/50 to 10 H. P.

SLOW SPEED gear motors, .08 to 1140 r.p.m., in 47 sizes from 1/50 to 10 H.P., are described and priced in this 100 page catalog, in such a simplified manner that any one can easily select the correct for almost any machine application.

Janette Manufacturing Co. 556-558 W Monroe St. Phicago, Ill.

TYPE "R" MULT-I PURPOSE

Disc grinding, polishing and surfacing machine

This Type "R" Machine is a combination of several types of grinding and polishing machines, principally the Disc Grinder, the Polishing Wheel and Belt Surfacing Machine. The machine is set up and supplied to do the work of these three machines.

This utility machine is adapted for a wide range of uses and will find a place in many shops where space and power are important factors of consideration.

The arrangement of the machine is such that three operators may work simultaneously without interfering with one another.



PRODUCTION MACHINE CO.

GREENFIELD, MASS.

Jefferson 71/2" Swivel Base Dividing Head

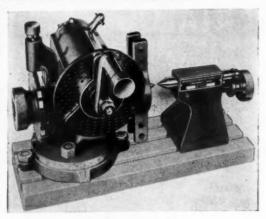
A new Swivel Base Dividing Head with a capacity for 7½" diameter work has been developed by Jefferson Machine Tool Co., 700 West Fourth St., Cincinnati, Ohio. Adjustment is 360 degrees in a horizontal plane by one degree graduations; suitable for ½" T-slots; adjustable tailstock with clamp lock for center.

The spindle is hardened and ground, with 2-%" six - thread nose; hole in spindle is No. 9 B & S taper.

The index operates by means of worm and worm gear with a 40:1 ratio. Index plates are

furnished to provide divisions from one to 50; even divisions from 50 to 100, plus 55, 65, 75, 85 and 95; all other divisions to 360 are shown on the index table. A direct index plate is provided for 2, 3, 4, 6, 8, 12 and 24 divisions. Dog plate, base bolts, hardened centers and index chart are furnished.

A 6" Tilting Dividing Head and a Plain Dividing Head, also Swivel and Plain Vises are included in the Jefferson accessory line. Still another useful item is a Vertical Head which converts a horizontal milling machine into a vertical milling machine. All of these items are described in de-

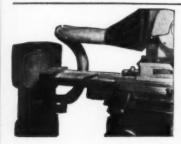


tail in a new bulletin. Carbide Grinder Bulletin

Hammond Machinery Builders, 1614 Douglas Ave., Kalamazoo, Mich., announce Bulletin No. 201, showing their complete line of Carbide Grinders.

Included is the firm's well-known Combination Chip Breaker And Cup Wheel Grinder, now accommodating up to 6 in diameter diamond chip breaker wheels on right side of machine, and 6 in diameter cup wheels on the left side.

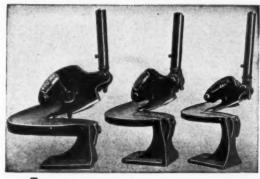
Those interested in obtaining full data on complete carbide tool maintenance will do well to have this bulletin in their files.



STOP DUST from GRINDERS with DUSTKOP

LOW COST DUSTKOP collects dusts from Surface, Tool and Precision Grinders... Compact, self-contained ¼ hp motor and fan... Easily renewable, spunglass filter cleans and returns air to room. Saves heat. Prompt deliveries of standard units on high priorities. Write for Bulletin A-500. See DUSTKOP in operation, Booth 120, A.S.T.E. Exhibition, Milwaukee.

AGET-DETROIT MFG. CO. 2042 Book Tower CA.3090 Detroit



Get
BEVERLY
Throatless
SHEARS

SAVE TIME ON WAR ORDERS!

If you're cutting straights—rounds or irregulars on War orders you can speed 'em up and eliminate distortion with a BEVERLY Bench-Type Shear. Order No. 1 for 14 Ga., No. 2 for 10 Ga., No. 3 for 3/16* mild steel and 10 ga., stainless.

BEVERLY SHEAR CO., 3005 W. 110th Pl., Chicago, Ill.

THE Robertson COMPOUND HIGHE WHEEL DRESSER



saves precious man-hours in production

This precision instrument is playing a vital, important part in America's all-out war effort...speeding-up production, by saving both time and money.

With the Robertson Compound-angle Wheel

With the Robertson Compound-angle Wheel Dresser, a machine operator can dress an included angle tangent-to-radius from 00 up to and including 1800 at one setting, thus eliminating the old method of "trial and error" dressing.

Write TODAY for illustrated descriptive folder.

F.H.ROBERTSON CO.

Anderson Roto-Checker

Anderson Bros. Mfg. Co., Rockford, Ill., have developed a new piece of equipment for seedy checking of straight shafting, tubing, or pieces that have the same diameter at both ends.

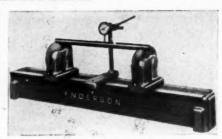
The work can be mounted directly on the discs, which rotate in supersensitive ball hearings. The time customarily used for cleaning and conditioning centers can be eliminated, also for mounting between centers.

The equipment also provides for balancing, as the spindles and

bearings are the same standard supersenitive parts used in Anderson balancing equipment,

The Roto-Checker is mounted on a rugged, well ribbed cast iron base, scraped to precision, and is equipped with a dial test indicator.

The first model is designed to handle work 36" long. However, equipment can be supplied for longer and larger sizes to suit customers' requirements.



Accident Prevention Equipment

Cooperating with the President's "must" campaign for the further prevention of industrial accidents—Catalog No. 50, containing 144 pages—134 pages describing safety equipment and 10 page index—has just been released by The Boyer Campbell Co., 6540 Antoine, Detroit.





ASK FOR BULLETINS ON COMPLETE LINE

Above: Baldor Special Carbide Tool Grinder, ½ h. p. ball-bearing motor, 6° Silicon Carbide wheels,

Ask for Bulletin 305;

At left: BALDOR Grinder No. 101, 1½ h.p., ball-bearing motor; 1725 r. p. m., 220 volts, 3-phase, 60 cy; \$00.00 (As for Bulletin 307).

BALDOR ELECTRIC COMPANY
4368 Duncan Ave., St. Louis, Mo.

MODEL 1298 Si-ta, Threat Si-ta, Threat

You can **UP** production ...even with unskilled labor

From almost any material—steel, stainless steel, brass, aluminum, metal screen, fiber, paper products—even an unskilled worker soon learns to cut intricate combinations of circles, angles, and curves, rapidly, accurately, cleanly. A Libert shear does not nibble. Edges are smooth, need no finishing. Inside cuts are no harder than outside, whether it's flat sheets or formed work. No starting holes are necessary. Write for Bulletin.

CIRCLE CUTTING ATTACHMENT Included as Standard Equipment With This Machine Made in sizes up to 60-in. throat, 10-gauge capacity

1-H 4

Libert HESPEED SHEAR

LIBERT MACHINE COMPANY, GREEN BAY, WISCONSIN

HOPPERS

ADAPTABLE TO ANY MACHINE

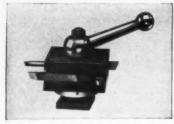
Will Feed Nuts, Plain Washers, Screws, Screw Blanks, Rivets, Bullet Cores, Pins, Bearing Rollers, and many special parts.



Send Samples For Feeding Speeds

DETROIT POWER SCREWDRIVER CO. 2809 W. FORT ST., DETROIT, MICH.

Enco Turret Tool Posts-for Bench and Small Engine Lathes



Model "S" - Four tool, 8 position Turret Tool Post 2} sq. \$23.00



Model "H" - Sixtool, 12 position Turret Tool Post, 3º Hex. \$25

The new "ENCO" adjustable Turret Tool Posts for Bench and small Engine lathes and small screw machines are carefully engineered lathe accessories that have many advantages: There are two positions for each tool, giving 6 and 12 positions on the Four and Six tool, Turret Tool posts, respectively. Take standard square tool bits and boring tools.

Head can be raised or lowered to center tools. Turret is rigidly mounted in T-slot of compound. Indexing is easy, accurate and positive. Indexing mechanism is self-contained, eliminating all possibility of chip interference. Case hardened steel construction. Eliminates many second operation set-ups. When ordering, give make of lathe and swing.

EASTERN TOOL SUPPLY CO.

"The House that Quality and Price Built"

173 Mulberry St.,

New York, N.Y.

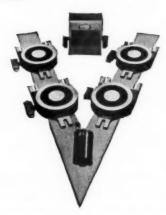
Holding Tank Armor Plate

A new type of 12" circular magnetic chuck has been developed by Anderson & Brown Co., 2036 E. 22d St., Cleveland, Ohio. Altho it should have many industrial applications, it was developed primarily to hold tank armor plate securely on grinders, planers, flame cutting tables, etc.

The sturdy chuck bodies are of cast steel and the design is said to eliminate stray magnetic fields. The chucks operate in parallel on 6-volts d-c supplied by a rectifier from any convenient 110 or 220 volt a-c line. The makers say that the magnetic flux developed is of sufficient intensity to penetrate 2½ steel plates. Provision is made for demagnetizing the work.

The chucks are very flexible in application and may be used as required. They may be moved readily from planer to grinder to flame cutting table. They incorporate 6-volt windings of the same general type as used in the stand-

ard line of Anderson & Brown units. The makers stress the fact that the low operating voltage eliminates inductive kickback, as well as danger of shocks.



MODEL No. 16 "SPECIAL"

CONSTRUCTED AS PER SPECIFICATIONS OF U. S.

BUTTERFLY FILING and SAWING MACHINE

(Die Making Machine)

This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of machine is usually adopted in Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired. We also manufacture smaller models—Model D-10° Table; Model E.L. 12° Table;

HARVEY MFG. CORP.

Phone CAnal 6-5170



BEWARE OF

Registered U. S. Patent Office

PRODUCTION Goes Up Production Costs Go DOWN ... with NICHOLSON Expanding MANDRELS



TYPE A-STEP JAW DESIGN

Especially adapted for holding work with short bores while being machined between centers on lathes, grinders, millers, shapers, etc.

Size No.	Range of Bores Taken	Net Price	
1A	1/2" to 1"	\$12.00	
2A 3A	1" to 11/2"	16.00 23.00	
4A	2" to 3"	34.00	
5A	3" to 4"	40.00	



TYPE B-STRAIGHT JAW DESIGN
Adapted for work with both short
and long bores.

Size No.	Range of Bores Taken	Net Price
1X	1/2" to 9/16"	\$10.00
2X	9/16" to 21/32"	11.00
ЗХ	21/32" to 34"	12.00
00	3/4" to 3/4"	14.00
0	%" to 1"	16.00
1	1" to 11/4"	18.00
2	11/4" to 1-9/16"	21.00
3	1-9/16" to 2"	29.00
4	2" to 21/2"	40.00

(Other Sizes Taking Up to 7° Bores) Hardened tool steel, accurately ground. Sold singly or in sets. Prompt delivery. Write for bulletin.

W. H. NICHOLSON & CO., 117 OREGON ST., WILKES-BARRE, PA.



ADJUSTABLE HOLLOW MILLS

16 standard sizes—Cutting capacities 1/32" to 2". Also specials made to order.

in micrometer dial adjustment. Prompt delivery -even on specials. Write for Catalog No. 15. CARL WIRTH & SON.

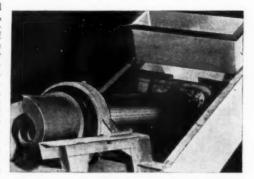
Rochester, N. Y. 1625 Clinton Ave., N.

Removing Parts from Quench

A Spiralveyor, developed by Salem Engineering Co., Salem, Ohio, is used for removing large quantities of heat treated parts from the quench. Small stampings or forgings may leave the discharge end of a furnace, enter the quench, and the Spiralveyor will not only remove them, but will convey the parts to a pickling unit at a rate of 8,000 pounds per hour. The unit is an inclined 18" diameter, perforated steel tube thru which a spiral conveyor screw operates and carries parts thru the tube and out of the quench.

Since the wall of the tube is perforated with 9/32" holes, all the water is tumbled out of the components, thereby permitting the parts to enter the pickling solution without diluting the bath with water from the quench.

The Spiralveyor is of practical value



when used in connection with heat treating furnaces. However, Salem's engineers will gladly co-operate with any other war production industry which feels that the Spiralveyor principle could be applied to their high speed war production equipment.



GOOD NEWS for DIE MAKERS

Transfer Points Eliminate Guesswork in Die Making

There's no chance for error when you use transfer screws as markers in setting dies. Points are of uniform height above hex base. Six accurately made and hardened screws nest in a special holder with hex wrench tip. Made in ½ to 1 that diameters. 3/161 5/16* \$1.25 per set 3/8* 1.35 * * 7/16* 1.50 s s 1/2*

HEIMANN MFG. CO.,

URBANA, OHIO



Shear Cut -High Speed

END MILLS

Shear Cut End Mills are offered in all standard sizes, single and double end.

Write for catalog and prices today.

PROGRESSIVE TOOL & CUTTER CO. 2345 WOLCOTT ST., FERNDALE, MICHIGAN

A USEFUL ADDITION

Modern precision machine shops and inspection departments will find this sturdy 36"x 48" MILWAUKEE SURFACE PLATE a valuable addition. Constructed of semi-steel, accurately machined, securely mounted on cast legs which are machined and provided with SAE adjusting screws for perfect alignment. Height from floor to top of plate 30". Can also be had in 38". Shipping weight 1200 lbs.

We also manufacture angles and parallels as shown underneath surface plate.

We also make larger and smaller plates either with planed or scraped surfaces, whichever is desired. Write today for full information.

C. BUSCH COMPANY ENGINEERS AND MACHINISTS

SINCE 1907

165 SO. BARCLAY ST.,

MILWAUKEE, WIS

REYNOLDS COOLANT SYSTEMS FOR MACHINE TOOLS



Approximate capacity, 12 gal. Notank. ½ HP. motor. For Milling and Screw Machines,

Lathes, etc. 110 volt, 1 phase model, and 220 volt, 3 phase model -\$75.00 each. 550 volt, 3 phase model, \$86.25.



Approximately 7 gal. capacity; 16* x 10* x 11* tank. ¼ H.P. motor. For Milling and Screw Machines, etc. \$98.50 each for 110 volt, 1 phase model, and 220

volt, 3 phase model. 550 volt, 3 phase model—\$108.50.



Approximately 15 gal. capacity. Tank 20*x16*x16*. ¼ H. P. motor. For grinding machines, multiple spindle drills. \$95.00 each for the 110 volt, 1 phase model, and 220 volt, 3 phase mod-

el. \$112.00 for the 550 volt, 3 phase model.



Dealers Write for Resale Discounts

REYNOLDS MACHINERY CO.
211 EDDY STREET
PROVIDENCE RHODE ISLAND

Granite Surface Plates

A radical new idea in Precision Surface Plates is offered by the Herman Stone Co., 1238 Leonhard St., Dayton, Ohio. The innovation involves the use of an especially hard species of Granite instead of ferrous material. The supply of this Granite is said to be unlimited—it is not an essential war material and it is said to be harder than any tool that might be used on its surface.



The working surface of each Precision Granite Surface Plate is processed flat while being supported on a 3-point bearing. These bearings remain on the plate permanently so the plate can only be used in the manner in which it was finished. The extra hard surface of the plates are said to be practically indestructible under normal use, and the specially treated non-abrasive qualities prevent tool wear.

The plates are said to be accurate to 1/10,000 inch per square foot, and there are no internal strains to cause warpage and they are rust and corrosion-proof.

Four stock sizes are available from 12×18 " to 24×36 ". Special sizes will be made to order.

Allen Power Bench Type Punch Press



A Small punch press for small work.

Height 17½". Base 8½x8½" Flywheel 10° D. Wt. 28 lb. Stroke ¾° Capacity soft iron ¾°Dx½6° Weight 120 lb. Power required ¼ to ½ H. P.

Price \$125.00 Circular on request.

Alva F. Allen, Clinton, Mo.



ADJUSTABLE SPEED SNAGGING GRINDER

FOUR-SPEED GEAR DRIVE TRANSMISSION

SAVE

on maintenance costs

- four-speed gear drive transmission maintains efficient peripheral speed down to the flanges resulting in fewest possible wheel changes;
- speed change by hand-lever on front
- · heavy duty ball bearings
- one-piece chrome manganese steel grinding wheel spindle
- · four speeds
- 7½, 10 or 15 h. p.



* CONTOUR CUTTING with ATLANTIC Band Saw Blades

speeds production

Atlantic Metal Cutting Band Saw Blades have been developed through twenty years of research and specialization.



Special Containers for narrow width coils, 100' length. Convenient to use. ATLANTIC SAWMFG.CO.

Metal Cutting Band Saws Exclusively

153 Brewery St., New Haven, Conn. SEND FOR FREE BOOKLET





THESE BAGS SAVE TIME

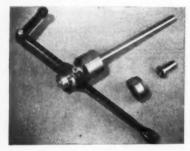
... And money, too! Cotton parts bags save up to 90% of packing and crating time, and mailing bags save up to 90% of postage and packaging cost. Write today for samples, prices and for FREE reprint: "Cotton Bags in Work Expedition"



THE AMES BAG CO.

Bench Lathe Speed-up

A collet-closer which permits feeding and releasing of bar stock thru collet without stoppage of lathe, is announced by Recor Mfg. Corp., 430 S. Green St., Chicago, as an important production booster, converting bench lathes for precision hand screw machine operation.



It is designed to attach easily to any bench lathe, South Bend, Atlas, Logan, etc., having No. 3 Morse taper in the headstock, and will feed any length stock, from 1/64 to ½-in. thru the spindle. Step collets can be made for larger diameters and used for second operations only.

Gripping action of the collet-closer is adjustable to desired tension without loss of time. It is precision machined from selected materials, with all essential parts hardened and ground. Cam is mounted in ball-bearing, to assure smooth running.

Where priority matters are in order, the firm's literature states, it can make 10-day deliveries.

"Solders That Stand Up"

A new folder describes substitute solders, regular solders and Alpha service in solving solder problems. The Lead-Tin Fusion graph on the back page will be of value to anyone having solder difficulties due to the tin shortage. Copies are available from Alpha Metal & Rolling Mills, Inc., 363 Hudson Ave., Brooklyn, N. Y.



Mill Over 1,000 Parts Per Hour

WITH THE

NEW Dearborn Automatic Chucking and Indexing Fixture

Work held by draw in collets. Collets open and close automatically. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces. Minimum set-up time required. Speeds up production. Positive and accurate in operation.

J. W. DEARBORN

72 S. CLIFF ST.

ANSONIA, CONN.



Precision

roous

Gauges

Mechanics will welcome the introduction of the Pal Precision Gauge, with improved feature of close adjustment. The Pal Precision Gauge is a dependable and handy measuring tool and is offered at a very reasonable price. • The Pal Precision Gauge is 10½ inches in height, has a full 6½ inch range. It can be converted from a calibre to a height gauge in ten seconds, and has direct reading inside and outside.

The PAL Precision Gauge has many new features, including the following: — Plastic base, making it lighter and rust proof; cast iron sole plate for longer wear; detachable scriber; swift motion assembler which eliminates all thumb screws; self-locking sensitives.

tive adjustment.

PAL TOOL COMPANY

ADD TASE THERSE FIRST STREET. HISBERPOLIS, MINNESOTE

GES Electric Hand Shears NOW AVAILABLE - FOR NATIONAL DEFENSE



This new sheet metal shear was brought out to fill the demand of the sheet metal industry for a very light weight but powerful, tast cutting tool, capable of cutting accurately to the line along straight lines as well as along small curves.

This sturdy shear will give a life time of service. The ball bearing "Grip" type Universal motor % horse power will operate on either AC or DC and 110 or 220 voits, 25 to 60 cycles. This new model has fuse protection incorporated in switch box. Alloy Steel cutters—will cut at the rate of 6'6' per minute on 14 gauge sheet steel. Write for further information.

James W. George Machinery Company
3146 EAST JEFFERSON AVENUE, DETROIT, MICHIGAN



On Lathes, Millers, Grinders, turning today's heavy loads at high speeds is no problem when you have IDEAL Live Centers. They rotate with the work, on selected precision ball and taper roller bearings.

* Three Interchangeable Center Pieces are available; to meet the needs of all types of centered and uncentered work. Exclusive IDEAL feature. SAVE SET-UP TIME.

IDEAN METAL ETCHER PREVENTS DELAYS due to loss, theft, mistakes-

Permanently Marks

Tools, Dies, Parts, Gages, etc.

NEW!> purpose

Alletcherfor

permanently marking smooth surfaced iron, steel and their alloys. 14 heats. Etches legibly, easily, permanent-ly, regardless of hardness of metal.

MOST COMPLETE LINE OF MARKING TOOLS

FREE MACHINE TOOL ACCESSORIES

Full of details on Time and Money-Saving Devices

III) : 14 COMMUTATOR DRESSER COMPANY Sycamore, Illinois 1441 Park Avenue

SALES OFFICES IN ALL PRINCIPAL CITIES In Canada: Irving Smith, Ltd., Montreal, Quebec

New Lapping Plate

The makers say that Smith Precision Lapping Plates are specifically designed for developing a true plane of close tolerance, thus insuring perfect fit when lapping metal-to-metal joints and all other uses requiring accurate flat-lapped surfaces.

These plates embody the same elliptical rib construction which characterizes Smith Master Surface Plates. The large elliptical rib with internal spider rib construction and supporting ribs to outer edges are claimed to be so designed that their depth and placement give maximum rigidity and stiffness with a minimum of deflection.

The close tolerance accuracy of the Plates is checked with the three-plate system which is considered fundamental for arriving at primary standards for flatness, including optical flats. All plates are precision lapped to a final fat surface and grooved at an angle. As these angle grooves cross each other, a series of diamond shape flat areas is formed.

Prompt shipments are being made in a large variety of standard sizes ranging from 8 x 12 to 48 x 120", by Smith Tool & Engineering Co., 810 N. Sandusky Ave., Bucyrus, Ohio,

Spray Operation Handbook

An interesting 32-page, 8 1/2 x 11 booklet entitled Eclipse Spray Equipment on the Job has just been issued. It is like taking a sight-seeing trip without leaving your desk, to see how the other fellow handles his spray problems. The 8" picture of actual spray operations in various industries such as shipbuilding, aircraft, baking (spraying grease on bread pans), machinery, leather, structural steel, munitions, will give the reader some idea of the scope of the equipment's application. Comments from several users reflect satisfaction with the results obtained.

The Eclipse Air Brush Co., Inc., 400 Park Ave., Newark, N. J. will send a copy of the booklet free to any one requesting it on company letterhead.

DESMOND GRINDING WHEEL DRESSERS and CUTTERS



We can supply you with the proper Dressers and Cutters for all of your grinding wheels.

Ask for copy of our catalog and name of your nearest dealer.

SIMPLEX Steel Slide ISES



A full line of Machinists' Filers, Welders, Production and Drill Press and Milling Machine Vises.

Let us send you our vise catalog and name of your nearest dealer.

The DESMOND-STEPHAN MFG. CO., Urbana, Ohio

A CLAMP for Every Purpose



Forged Steel **Quick Acting** Deep Reach Welders





Sizes Available: 3/4" to 10' opening 1/2" to 16" deep

Write for CATALOG and PRICES on Clamps for all purposes as well as many other tools for use in the Machine Shop.

IN STOCK AT YOUR SUPPLY HOUSE

The Cincinnati Tool Co., 1945 WAVERLY AVE., CINCINNATI, OHIO

PUNCH SMALL PARTS FASTER

DURO, aircraft type, punch presses are constructed to precision punch aluminum, dural, and other sheet metal and plastics. Write today for illustrated catalog on Duro Punch Presses, Bench Milling Machines, and Accessories.



DURO MANUFACTURING CO.

RECONDITION YOUR SAWS— AT EXTREMELY LOW COST

Howe - Lindsey Automatic Saw Sharpener, the fastest and most compact machine for sharpening hack saws, band saws, or metal alitting saws. Automatic in action, requiring unskilled labor; will produce nearly perfect cutting tooth, provides for greater production and longer life of blades, saving steel. Write for Circular.



HOWE & SON, Inc. Hinsdale, N. H.

Air-Hardening Folder

C. N. S., air-hardening, high Carbon-Chrome-Moly die steel is fully detailed in a new folder by Jessop Steel Co., Washington, Pa.

Analysis, says Jessop, is so balanced that the product gives maximum hardness and toughness with a high degree of resistance to corrosion. It is also said to be non-changing for general purpose work, demanding high wear and shock-resistance. It analyzes, according to the firm:—Carbon, 1.50%; Chrome, 12.00%; Molybdenum, .75%. Developed for air-hardening, the steel, it is pointed out, can be oil-hardened, if desired.

The material is advanced by the makers as affording more pieces per grind of die, its deep-hardening characteristics permitting, also, more grinds per die. Increased production, states the folder, saves die steel, reduces die set-up and maintenance time, conconserves time of die-makers and lessens burden on die-making machines and grinding equipment.

A Finer Place to Stay

FORT MEIGS

250 WITH BATH FROM \$2.50

The superiority of Fort Meigs Hotel is attested to by experienced travelers who appreciate its beautiful, comfortable accommodations and reasonable rates. Purple Cow Coffee Shop and Maritime Buffet serve the best food in Ohio.

EDWARD SHERMAN, Manager

St. Clair between Madison & Jefferson

TOLEDO

ONE OF THE ALBERT PICK HOTELS

Radii & Angle Dresser Distributors Wanted



Immediate Delivery
Complete \$9000

Manufactured by

Jack Tool Co., 18901 Conant, Detroit, Mich.

PRECISION BENCH MILLER

Tapered Roller Bearings

for high-speed production or precision tool room work. Tool direction adjustable to 60 degrees each side of center. —write for catalog—



\$281.65 F.O.B. Plant

DURO MANUFACTURING CO.

"Dependable Durability" is built into the MARSCHKE LINE ... Significant is the

fact that Marschke Grinders which were in service during World War 1 are working for Victory today. This experience has resulted in dependable durability — long life and economical service — that can't be beat. Over 70 specifications of Swing Frame, Floor Stand and Pedestal Grinders—and Buffers—1 to 25 HP, 10st to 30st wheels, WRITE FOR CATALOG TO...

A MARSCHKE

* Cuts Costs
* Saves Man-Hours

VONNEGUT MOULDER CORPORATION

1805 Madison Ave. Indianapolis, Ind.

MARSCHKE

GRINDERS

BUFFERS



VONNEGUT MOULDER CORP. INDIANAPOLIS

WE INVITE YOU TO TRY



The World's Best Rubberized abrasives for Fine Grinding and Polishing

Attach this advertisement to your card or letterhead. We will send you a free trial sample. Or if you prefer send \$1.00 for Special 33 wheel assortment.

CRATEX MFG. CO., 81 Natoma St., San Francisco, Calif.

• M - B • AIR-LINE FILTER and AUTOMATIC LUBRICATOR

Removes 96% to 97% of All Water, Dirt and Scale from Airline



Air passes through a series of brass disea with .002 spacings, providing the finest degree of filtration obtainable by any known method. Theu, as the air passes through head of Lubricator, oil is delivered into the purified airline in any desired volume.

A combination of this kind is only as efficient as the filter unit of the assembly. Write today.

M-B PRODUCTS . EXPOSE OFFICE AN WRITERALL ST

Precision Tapping Books

"How-to" help for those with demand for Class 3 or 4-gage fits, tapped in any material, on speedy war schedules, is offered in 6 booklets by Bakewell Mfg. Co., 2023 Santa Fe Ave., Los Angeles, Cal.

Three new catalogs are devoted to 3 precision tapping machines. No. 1 has capacities of 4-40 to $\frac{5}{8}$ in, in steels. 1-R deals with the same-sized holes on large bulky jobs, while No. 2 treats with tapping holes from $\frac{3}{8}$ to $\frac{11}{2}$ in, in steels.

The books are beautifully illustrated and constitute an informative tract on modern production tapping methods, valuable to beginner and oldster, alike, and especially indicated in these days of trainees, everywhere.

The other 3 books are mainly for owners of the equipment and show how to get the most from it. They are named "How To Operate The Bakewell Tapping Machine, and are successively numbered from 1 to 3.

Speed-Reducers

In a 100-page Bulletin 22-27, speed reducers, sized 1/50 to 10 hp with speeds from .08 to 1140 rpm are fully detailed by Janette Mfg. Co., 556 W. Monroe St., Chicago.

Builders of geared electrical apparatus for more than 33 years, the firm's experience and knowledge in this field is widely accepted. With the bulletin accounting for virtually any practical problem involving speed-reduction technique, it can function as source of engineering data as well as of procurement information in executive offices.

5000 SIZES Files SHAPES AND SWISS FILES

Ask for Catalog WF.

The most complete catalog of its kind. Lists 5000 different shapes, sizes and cuts of GROBET Precision Swiss Files. Ask also for catalog WM on files for filing machines.

Learn more about these Chrome Steel Files that have won a reputation for utmost precision and durability.

GROBET FILE CO. OF AMERICA 421 Canal St., New York, N. Y.



You Can't Buy Man-Power . . . but

YOU CAN STILL BUY

PORTELVATOR

(Portable Elevating Table)

THE HAMILTON TOOL CO.

Ninth and Hanover Streets.

OHIO

Geared For Victory Gear Specialists

For moving tools or work . . . for use as a table or

supporting unit...

you'll be amased at how many steps and back - break-

ing, time-wasting

- SPUR
- · WORM
- . BEVEL
- · HELICAL

The Taylor Machine Co.



1917 EAST 61st ST., CLEVELAND, OHIO

"TAYLOR - MADE"

TROYKE ROTARY TABLES



Sizes 9", 12", 15" and 18".

Ask your dealer or write us for eight page catalog.

ALFRED A. TROYKE

4422 Appleton St.,

Cincinnati, O.

GROBET ROTARY FILES ground from the solid

Ask for Catalog WG

the most complete catalog of its kind, illustrating hundreds of rotary files hand cut, milled cut, ground from the solid; also diesinkers' burs.

GROBET FILE CO. OF AMERICA 421 Canal St., New York, N.Y.



and Detroit, Michigan, also Die Supply Company, 4747 Hough Avenue, Cleveland, Ohio. Pacific coast users now obtain quick service from Jamison Steel Corporation, 2168 East Olympic, Boulevard, Los Angeles, California and 508 Fourth Street, San Francisco, California.

Die Makers' Accessories—Dowel Pins, Socket Screws, Stripper Bolts, Die Springs—in stock at above points.

War plants needing above items can depend on best possible service from Producto.

Use Producto Modern Machine Vises—Ask for circular.

THE PRODUCTO MACHINE COMPANY

3019 MEDBURY BRIDGEPORT, CONNECTICUT

Koilkote-Protective Coating

A new protective coating material, designed especially for use on steel coils in rustproofing systems has been developed by Michigan Chrome & Chemical Co., 6350 East Jefferson Ave., Detroit, Mich. This material, to be known as Koilkote, is said to save hours of time usually spent in removing deposits and to lengthen useful life of the coils.

In ordinary practice, the coils in rustproofing systems which are in constant use, must necessarily be removed and cleaned approximately every 2 weeks. The method used to remove the deposits has been by pounding with a sledge, with the obvious possibility of damaging the coils. Ordinarily it requires almost a full day of a man's time.

With Koilkote, it is said to be un-

necessary to clean the coils more than once in 5 or 6 weeks. Actual cleaning time then is usually less than one hour since deposits do not form so heavily or so quickly on the protective coating. There is little appreciable difference in the heating efficiency of the coils between cleaning periods. Koilkote is quickly applied and it adheres firmly to the steel surface, and deposits are easily removed.

Lincoln Milling Machine

A new 4-page bulletin illustrates and describes a high speed milling machine base which accommodates any make of high speed milling head; high speed milling head attachment for milling, drilling, or boring; and extra parts and accessories. Chart shows specifications for table size. Address Lincoln Machine Specialty Co., 549 W. Washington, Chicago, Ill.

SOLVE YOUR "SHORT RUN" DIE PROBLEMS

SEND FOR CATALOG

It's an eye-opener on what you can do without dies, and gives details on Di-AcroShears, Brakes, Benders.

METAL DUPLKATING

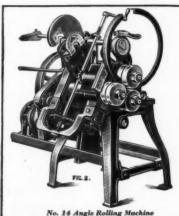


Use "DIE-LESS DUPLICATING" with Di-Acro Shears, Brakes, Benders. All duplicated work is accurate to .001". You'll get a new slant on "short-run" production problems from the great variety of parts which can be produced by Di-Acro Machines. Thousands of them are in use saving Man Hours and Critical Materials.





314 8th Avenue So., Minneapolis, Minn.



ROLLS ANGLES, TEE IRON, PIPE,

FLATS, ROUNDS AND SQUARES

HERE IS A

THAT HAS FOUND ITS WAY INTO

used by Manufacturers of

SHIPS-PLANES-TANKS-AUTOMO-BILES-ENGINES-FURNACES-FARM MACHINES AND METAL PRODUCTS OF ALL KINDS

also by

U.S. ARMY-U.S. NAVY-N.Y.A. UNIVERSITIES

There's a Reason!

CAPACITY-2'x2'x¼' ANGLE EXCELSIOR TOOL & MACHINE CO. EAST ST. LOUIS. ILLINOIS

THE BOOK CORNER

By M. H. KAUER

Tool Design: 443 pages. By Cyril Donaldson and George H. McCain. Published by Harper & Brothers, 49 E. 33d St., New York. \$3.75, postpaid.

General methods of tool design, aimed to enable students to develop ideas into practical specifications for modern production. Altho prepared for students of tool design, practical tool engineers, tool makers, time study men, foremen, etc., will find the volume handy in solving their everyday

problems.

The material is arranged to permit problems to be submitted individually, the instructor acting as a practical chief tool designer. Scheme of the profusion of illustrations aims to afford students an idea of the general nature of the tools to be designed. Many photographs have been contributed by various manufacturers. They greatly enrich the text. Collectively, illustrations make it possible for instructors to advise, give suggestions for design improvement, indicate possible weaknesses and impractical ideas and counsel those needing additional help.

The work is part of a series, developed at Rochester Athenaeum And Mechanics Institute, as part of its program for developing teaching materials, practical in nature and closely related to actual job-requirements in industry.

Chemical-Technical Dictionary: 870 pages. By A. W. Mayer. German, English, French, Russian. With translations by Profs. B. N. Menshutkin and M. A. Bloch. Published by Chemical Publishing Co., 234 King St., Brook-

lyn, N. Y. \$8.00, postpaid.

Those engaged in the study of German, French and Russian chemical literature, will find this volume a great aid. It is also recommended to translators and students of these languages. In compilation, the author adhered to the German spelling of scientific terms, as accepted by Jansen and Duden, authors of German works on the subject. Many words in the dictionary have subgroups arranged in alphabetical order. In the light of present circumstances, this volume should be well received in circles engaged in war work and technical problems connected therewith.

Wage And Salary Stabilization: 39 pages. Published by National Fore-

Precise . . . Accurately Positioned The HAMILTON
MUEHLMATT
Super Sensitive
DRILLING MACHINE

TINY HOLES

THE HAMILTON TOOL CO.
Ninth and Hanover Streets.
HAMILTON ONIO

SUPER - sensitive drilling machine serves a double purpose: it assures exact precision drilling ... and it saves those small drills so hard to obtain. Install this machine and get both advantages.



COMET

BORING, FACING and INTERNAL THREADING TOOLS

For holes from 1/8" upward, 15 different sizes

Made of Super-High-Speed Steel Specially Heat Treated

Indispensable for your JIG BORER. The worm-like spiral of the boring heads provides a long, useful cutting surface. Their use insures perfect fitting threads. Correctly designed for precision work.

Write for complete data.

COMET TOOL CO. 738 Broadway, New York, N. Y.





MARK YOUR PARTS

Permanently

PART NUMBERS HEAT NUMBERS.

CATALOG NUMBERS, SERIAL NUMBERS.

PATENT NUMBERS

MANUFACTURER-INSTRUCTION DATA-INSPECTION

Positive, Permanent marking on your products assist prospects to order. Makes it easier to buy—new, repeats and repairs. Gives you a definite record of pertinent data on each part produced.

The Pneumatic marking machine illustrated is our HI-DUTY model 25 general purpose tool for short runs or production work. It operates from your shop air line and is one of numerous models built to produce neat, permanent markings quickly on metal fabrications.

We will be happy to make specific recommendations upon receipt of samples or prints of parts to be marked, showing approximate lettering, its location on the part, with required hourly production.

MARKED PARTS ADVERTISE
IN THE RIGHT PLACE, AT THE RIGHT TIME.

Send for complete catalog of our full line of marking Tools, Machinery and Equipment,

GEO. T. SCHMIDT, Inc.

1802 Belle Plaine Ave.,

Chicago, III.

PLUNKET IMPROVED VISES

Made Right-Work Right-Give Satisfaction

Drill Press Vise

With Extra Lugs for Bolting Down
No. 1-6" jaws, 1½" dees, open 5" wt. 35 lbs. 25.00
No. 2-10" jaws, 2½" dees, open 5" wt. 35 lbs. 25.00
Prices are net f. o. b. Chicago. Dealers' inquiries
are solicited. Write for illustrated folder today.

J. E. Plunket Machine Co., 1823 W. LAKE ST.

men's Institute, Deep River, Conn. Single copies, 50c (Special Quantity prices) F. O. B. Deep River, Conn.

A new manual for supervisors, foremen, personnel managers, and executives. It explains the meaning and application of the new payroll laws to workers. Written in clear non-technical language which everyone can understand, it clarifies and illustrates the many wage circumstances permitting increases, what they must do to qualify for these increases and shows how the law affects overtime pay, bonuses, War Bond purchases, insurance and pension benefits.

Supervising The Woman Worker: 34 pages. Published by National Foremen's Institute, Deep River, Conn. Single copies, 50c (Special Quantity prices) F. O. B. Deep River, Conn.

Embodies today's approach on supervising and training women. It tells what jobs women can do; describes the jobs they are now doing; best methods of hiring; how to set up standards of fitness and performance for typical jobs; wages of women; how women can be rated for promotion; and details many other matters of employee relations to which careful attention has to be paid to get good work done.

Three New Texts

Fundamentals of Electricity: 388 pages. By McDougal-Ranson-Dunlap. Published by American Technical Society, Drexel Ave. at 58th St., Chicago. \$2.00 postpaid.

Fundamentals of Machines: 294 pages. By Hobbs-Morrison-Kuns. Published by American Technical Society. \$2.00 postpaid.

Fundamental Machine Shop Training: 327 pages. By Shuman-Wright-Writchey. Published by American Technical Society. \$2.00 postpaid.

Produced in co-operation with the U.S. Office of Education and the Pre-induction Training Center of the War Department.

When a young man enters the fighting services, he again becomes a student. After basic training, he is introduced to the special instruction given in various branches of the service. Often he is introduced to a new world of tools, skills, equipment and technical terms.

Pre-induction training, says the publisher, is the necessary implement to speed up rapid building of our mechanized forces. Central idea in these books is orientation as recommended by U. S. Office of Education, as part of the High School Victory Corps Program.

These new books are especially designed and excellently adapted to this program. They are well printed, and illustrated texts, which can as well serve in employee-training classes, or for the employee's own self-instruction.

Texts are clear and easily understandable, with many illustrations. They are confined to practicable matters, as encountered in everyday applications, modern in treatment and scope, and presented in well organized sequence, for rapid, well assimilated progress.

Are You Using KNOCK-OUT CHUCKS?

- Keyless
- Slip proof
- Accurate
- Durable
- **Economical**



Write or wire for Bulletin DC 42-3H

THE K. O. LEE COMPANY ABERDEEN. **SOUTH DAKOTA**

SPEED UP FINAL OPERATIONS ON DIES, GEARS, SCREWS, LONG RODS GOLBORNE Speed Lathes AND SHAFTS WITH

For economical polishing, lapping or finishing of gears, shafts, dies, gages, ball races, long rods, etc.

Built to meet the requirements of those desiring a heavy constructed, smooth running machine of highest quality.

Has large built in motor with variable speed control, using REEVES standard pulley and belt.

Smooth automatic brakes act instantly when switch is thrown. Collets or chuck may be used.

WRITE FOR DETAILS TODAY

BUILDERS SINCE 1879 157 Division St. Chicago, III.



GOOD

CUT SANDING COSTS

MITY-MIDGET HIGH SPEED BLOCK SANDER



- **★ NO VIBRATION**
- ★ NON-STALLING

 Because of Super-Speed
- ★ FITS ANY JOB Even Fillet Work
- ★ FAST-EASY LOADING Wet or Dry Sanding

The smallest high speed block sander on the market . . . flexible, light weight and compact . . . cuts labor and abrasive costs 50 to 75% . . . perfect for feathering . . . adapted to wood, metal and composition surfaces.

Write for Descriptive Folder!

NATIONAL AIR SANDER, Inc. ROCKFORD, ILL., U. S. A.

Chrome Plated Cutting Tools

A special process of chrome plating the knife edges of cutting tools has been developed by Chief Engineer, Axel Lundbye of The Crowell - Collier Publishing Co., 250 Park Ave., New York City.

The new process is said to have proved equally effective on a wide variety of cutting tools, increasing the effectiveness and extending many fold, the useful periods between regrinds. The new process is said to make the chrome an integral part of the steel. Moreover, the chrome plate allows the tool to be sharpened repeatedly without loss of effectiveness. With the crucial tool steel shortage, scarcity of tool makers and the increased war production schedules, the importance of such a process is obvious.

To Companies engaged in war production, The Crowell-Collier Publishing Co., offer to treat samples of cutting tools free of charge. If these treated samples prove satisfactory, they will give directions for using the process on Government contracts, free

of charge, for the duration.

Westinghouse Linestarter

For machine tools, machinery, pumps, fans, etc. a new Size 2 Class 11-200 Linestarter, requiring less than half the mounting space of former units, without sacrifice of wiring space, is announced by Westinghouse Electric & Mfg. Co.

This compact Linestarter designed for group mountings, built-in applications or remote mountings has a new clapper-type armature with knife-edge bearings. It utilizes double-break silver-to-silver contacts, thus eliminating shunts and reducing maintenance. Overload relays are reset either by hand or automatically. On applications requiring sequence or auxiliary interlocking, provision is made for a total of 4 normally open or normally closed electrical interlocks.

Further information concerning the new Linestarter may be obtained from Department 7-N-20, East Pittsburgh,

Pa.

QUADRO PRECISION
LIVE CENTERS

5 REASONS Why They Meet Every Specification:

FOUR (4) ROWS of precision BEC-4 specification bearings.
 Note SHORT OVERHANG assuring rigidity and accuracy_eliminates "chatter"

3. Positive FELT-SEAL_excludes dirt_retains lubrication.
4. HARDENED AND GROUND CONE_point accurate to within

.0002.

DUTY -- Note Combined Radial Thrust Load at 100 R. P. M.

Tape No.	A	В	c	D	E	Cambined Radial-Threat Load At 100 R.P.M.	Not Price
2	1%	36	%	11168	2%	1600	\$23.00
3	1%	36	%	111/44	3%a	3300	\$25.00
4	21/12	1958	1964	11%a	4%a	7500	\$35.00
5	2%a	1%s	1	2%s	5%a	12000	847.00

All orders must be accompanied by extendable priority

FISHER TOOL CO. 226 LAFAYETTE STREET NEW YORK CITY

SAVE TIME ON INTRICATE ANGULAR SET-UPS . .

MULTI-SWIVEL VISE

Fully universal . . . three swivels simplify the setting of compound angles. Parts interchangeable . . . can be used as a plain flanged vise, a swivel vise or multi-swivel vise.



WRITE FOR INFORMATION

MASTER TOOL CO.
161 HIGH STREET . BOSTON MASS.



Avoiding Thumb Tack Heads

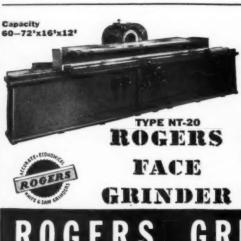


A new method of attaching drawings and blueprints to drawing boards, which eliminates the necessity of moving the T-square over thumb tack heads is offered thru the use of KumKleen Stickers. Paper thin, Kum-Kleen Stickers will lie flat, are applied without moistening, and are easily peeled off without a trace and without affecting the surfaces to which tiley are attached. All the adhesive remains on the label.

Kum-Kleen Stickers come in a variety of sizes and shapes and are made by Avery Adhesives, 451 East Third St., Los Angeles, Cal.

Keeping Shops Neat

Two new editions of a 4 and 6 page catalog describing the three models of Moto Sweeper have just been released by the Moto-Mower Co., Industrial Moto Sweeper Division, Detroit. Two of the "Sweeping Crew on Wheels" (the Commander and Fleetway) are motorized and have optional sulky equipment for the plants of great expanse. The other, Detroit Model, is manually operated. It is said to push as easily as a broom and to clean as much as 16,000 square feet of floor area per hour.



Specially Designed for STEADY, FAST PRODUCTION of Long, Narrow and Light Work

Takes work 10" to 12" high. Length of traveling table is 72"; width 16". Two speed table traverse. A 20" cylinder grinding wheel for medium duty service is powered by a 10 H.P. motor.

Send for Circular NT-20.

SAMUEL C. ROGERS & CO. 207 Dutton Ave., Buffalo, N. Y.

ROGERS GRINDERS
PRECISION QUALITY SINCE 1887

Hoist & Crane Maintenance

Because of the pressing shortage of experienced maintenance men and the fact that most materials - handling equipment is on grueling, three-shift wartime schedules, Robbins & Myers offers a new free maintenance folder to help prevent hoist and crane breakdowns that might hamper production. This folder was prepared by R & M hoist engineers and covers the vari-

ous phases of maintenance necessary for trouble-free performance. In addition, it is designed to serve as a permanent file for hoist parts lists, diagrams, instruction sheets, etc., thus enabling maintenance men to keep all such essential material together for quick reference. Copies will be sent promptly, in reply to inquiries addressed to Robbins & Myers, Inc., Hoist & Crane Division, Dept. M 20, Springfield, Ohio.

LATHE MANDRELS Hardened and Ground Tool Steel



These Mandrels are tapered .0005 to 1".

The Mandrels from %" to 1" are .0005 below size at the small end, and those 1% to 3" are .001 below size at the small end.

Diameter Inches	Whole Length Inches	Price Each	Diameter Inches	Whole Length Inches	Price Each
1/8 5/32 3/16 7/32 1/4 9/32 5/16 11/32 3/8 13/32 7/16 15/32 1/2 9/16 5/8	21/2 3 33/4 4 41/4 41/4 41/2 5 5 1/4 5 5 1/4 5 5 1/4	\$1.20 1.20 1.20 1.20 1.30 1.30 1.40 1.40 1.50 1.60 1.60 1.80	3/4 13/16 7/8 15/16 1 1 1/16 1 1/8 1 3/16 1 1/4 1 5/16 1 3/8 1 7/16 1 1/2	61/4 61/4 63/4 71/4 71/4 71/4 81/4 81/4 81/4	\$2.00 2.40 2.40 2.80 3.40 4.00 4.80 5.60 5.60

THESE LATHE MANDRELS ARE OFFERED FOR IMMEDIATE SHIPMENT.

SCHULTZ & ANDERSON CO.,

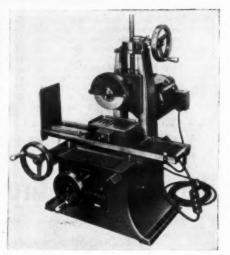
109A EDISON PLACE, NEWARK, N. J.

Versatile Bench Grinder

Need often arises for a versatile bench grinder for specialized jobs, to be done without waiting for release of otherwise engaged equipment. Said to fit such situations ideally, is this Sanford Bench Surface Grinder, offered by Eastern Machine & Tool Co., 170 Broadway, New York City. Hand-fed, it lends itself to many requirements.

It has spindle-speed of around 5,500 rpm, and is especially designed for small work demanding high accuracy and excellence of finish, working within claimed tolerances of .0001 in. Motor, magnetic chuck and rectifier are supplied with machine.

Featured are:-spindle of highgrade spindle-steel, ground to close limits, precision ball-bear-ing mounted, and provided with adjustments for wear; V-belt drive, fully enclosed and adjusta-



HERMAN Precision Granite SURFACE PLATES



Special Sizes on Request weights 12"x18"- 75 lbs.

18"x24"—160 lbs. 20"x30"—275 lbs. 24"x36"—480 lbs.

- Check these Features Replaces War Essential Metals
- Rust and Warp Proof
 Non-Abrasive
- · Hard, Precision Sur-
- Accurate to the Most Exacting Requirements · All Around Sturdy
- Construction
 Practically No Wearout with Normal Care

After extensive research certain types of extremely hard granite were found that are ideal for surface plates. The working surface of each PRECISION GRANITE Surface Plate is processed flat while being supported on a three point bearing. These bearings remain on the plate permanently so the plate can only be used in the manner in which it was finished. The diamond-hard surface of this surface plate is practically indestructible under normal conditions, assuring years of accurate service. The specially treated, non-abrasive qualities assure practically no wear on the finest tools. They may be used at or near grinding machinery without the surface bearing charged with abrasive particles. It is sufficient to merely wipe off the surface and the plate is ready for use. is ready for use.

THE HERMAN STONE CO.

WRITE FOR DETAILED FOLDER 1238 LEONHARD ST. DAYTON, OHIO



WITH THIS
TILTING
WIRE REEL

Save back work and all useless motion with the Nilson Tilting Wire Reel.

A foot lever is tripped, the guards removed a cail of wire slid upon the carrier, the guards replaced and set acrees tightened, an easy lift, and the counter-balancing weight does the rest, bringing the tilting section to an upright position, ready to feed the wire into the machine. Simple in operation, and may possibly save your men from injuries resulting in lost time and production.

Write for bulletin No. 51 giving full details.

The A. H. NILSON Machine Co.

DESIGNED FOR ALUMINUM AND STAINLESS STEEL

This NEW



Spot Welder

KT Model Press Type

Made in Voltages to meet Special Requirements where high Amperages and Controlled Pressure are required.

Timing Equipment for Special Jobs.

Air Operated, Oil Lubricated with Air Gauges for controlling pressure.

Water Cooled Electrodes - Refrigerating System may be added for High Production.



For additional information outlining exactly how this new welder will increase your production. Send us complete details regarding your welding problem. These Welders are individually designed to fit your needs.

300-322 Jackson St. THE TOPEKA FOUNDRY & IRON WORKS CO.,

Topeka, Kansas ble. Table rests by own weight, traveling on long, flat V-ways, ground and lapped for precision, and scraped to give proper lubrication. Operation is by hand wheel at extreme left. Movement is emphasized as extra sensitive and non-fatiguing.

Transverse carriage slides on long V-ways, also ground, lapped and scraped. Wheel at center is graduated in thousandths. Screw is precision-made, of high grade spindle steel, hand-wheel operated. Wheel is grad-

uated in .0005 in.

Magnetic chuck is specially designed. Top is of brass with close, highly magnetic iron laminations, and said to be more powerful than many standard types. Electronic rectifier is mounted in base, eliminating need of generator for chuck.

Specifications: — Maximum longitudinal travel, 6½ in; maximum transverse travel, 4 in; maximum vertical movement of wheel-head, 6 in; magnetic chuck width, 3 in, length, 5 in, height, 2 in. Maximum distance from

wheel to table under 4-in wheel, 6 in. Maximum distance between magnetic chuck and 4-in wheel, 4 in. Standard grinding wheel dimensions, 4x%x1/2 in. Spindle speed, approximately 5,500 rpm. Motor 1/6 hp, 110 volt, a-c, 60-cycle, 3,450 rpm. Net weight, about 130 lbs.

Sid Tool Catalog

In a catalog designed for quick and ready reference, Sid Tool Co., 177 Mulberry St., New York, lists its entire line of machine tools and accessories. Almost every practical need in the modern tool room is represented in standard items, on which the firm is in excellent position to make early deliveries, it states.

Prominent among these are high speed plug and gun taps, ranging from 6/32 to 9/16x18 in and a large stock of H.S. center drills, jobbers, wire gage, letter size, and taper shank H.S. drills, hack saw blades, emery cloth, tool bits, files and diamond dressers for emery

Quicker, better Degreasing with LESS LABOR

with this new PHILLIPS PORTABLE VAPOR Degreasing Machine

Here is the perfect portable degreaser with many exclusive advantages. Eliminates hand work. Reduces parts damage. Quickly removes all oil and grease from all types of work by improved vapor method. Efficient solvent can be used over and over.

Self-contained, Electrically heated and controlled—No water lines—No steam lines— No gas lines

degreasing operations can be carried on at point of production. Saves cost and time of transportation. Speeds up production.

Write for Catalog

giving full details on various sizes and models for degreasing loads from 10 lbs. to 10 tons—with or without power driven flushers. Special machines for special jobs.

shells. Automatic conveyor system. Handles 100 to 5000 per hour. Portable or stationary models. Write for full details.

Special Shell

Degreasing Unit

Designed to degrease inside and outside of 20 to 75 mm.

PHILLIPS Manufacturing Company

3480 W. Touhy Ave., Chicago, Illinois

YOUR FIRST LINE OF DEFENSE against

HIGH SHARPENING COSTS

No. 57T Automatically Sharpens Metal Saws in gangs

up to 8" in diameter. Takes gangs up to 31/2" thick. The saws are automatically indexed and sharpened within variation of plus or minus .001 of exact diameter of entire lot.

> Write for Folder 57T.



THE WARDWELL MFG. CO.

3165 Fulton Rd.

Cleveland, Ohio

WHITNEY- JENSEN PRODUCTS

18" PRESS BRAKE

Specially designed to meet the need for a small power-driven press brake for moderate-sized work. Capacity, 14 ga. iron, 72 strokes per minute. Ram and die shoes machined for standard 1/2" tongues. Powerful, extremely sturdy, fast, easy to adjust, accurate, with many practical features.



Write for new Whitney-JENSEN AIRCRAFT TOOLS CATALOG

WHITNEY METAL TOOL COMPANY

Adjustable Responded! MASTER FEED FINGERS For Automatic Screw Machines cover the entire range of your screw machines for a few inserts. · Feed all shapes

· Hold at high speed ۰ Greater grip area No rebound

Can't mar stock

· Easy to load

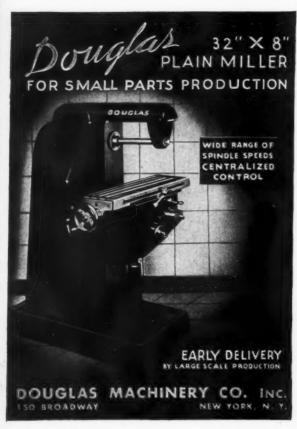
NO SEARCHING FOR FINGER AND PADS

A real production speed-up with new and exclusive features. Solid, long-wear, break-proof construction. No moving parts, no springs. Adjustable by simply selecting insert nearest stock size, inserting into finger, applying tension ring and placing on machine. Soft composition contacts prevent marring of stock Order now. Satisfaction guaranteed.



P. O. BOX 704 ROCKFORD, ILLINOIS

SEND FOR BULLETIN GIVING DETAILS



Storage

Revolving storage elements are gaining in popularity.

One type, for storing small parts, is made up of 24 small bins. No bin is larger than 4x4x3 in. Together, they form a nearly cubical ascubical as-mounted on sembly, a suitable revolving base. Larger rotary bins of stock - room size are also availa-Often the bins contain sub-segments to accommodate given items. Such revolving trays can be as high as 7 ft, and still afford easy access to wanted items. There is no straining necessary to reach backs of bins, because all are easily and quickly brought into handy position.

For storage of shafting, pipe, bar me talls, mouldings, etc., there is probably no better means than steel racks of A-frame type. They can be arranged in continuity with frames as obtainable from various manufacturers.

Prevents Spatter Adhesions

Midland Paint & Varnish Co., 9115 Reno Ave., Cleveland, announces No-Spat, a liquid said to prevent adhesion of welding spatter. According to the manufacturer, No-Spat should be brushed over the seam and area where weld spatter may fall. After welding, spatter may be wiped away. No chipping or grinding is necessary.

The manufacturer further claims that No-Spat fuses with the molten metal a n d maintains maximum tensile

strength by floating off impurities and preventing porosity; stabilizes the arc, thus minimizing rod spatter and saving much rod metal. The product, it is said, is being used on many war production welding jobs, being preferred by welders working in close quarters, because of absence of obnoxious fumes. One war production plant, found that by coating jigs (used to hold and align parts to be welded) with No-Spat, production increased and spoilage almost disappeared.



Torret Head Rody to of coul the accurately machined and of ample strength to insure long life. The Index Pin of hardened steel is easily operated by lifting the knurled knoh at top of Turret Body. Center Post of very heavy construction and equipped with lock nut, flatted to allow for a solid connection to the top of compound. Index Plate equipped with ten stops allowing for tan different tool settings.

WRITE FOR FOLDER GIVING COMPLETE DETAILS.

AUTOMATIC MACHINE & TOOL CO.

132 CHARLES ST. AUBURNDALE, MASS.



SPOILAGE OF YOUR CUTTING OIL PREVENTED

● DOLGE makes this offer without reservation: if you will authorize our laboratories to diagnose your particular cutting oil conditions without cost to you, and if you will follow our recommendations, we guarantee practical sterility of your cutting oil.

There is no guesswork. Only where our thorough laboratory examination demonstrates the need is a STERIDOL cutting oil germicide supplied. The STERIDOL recommended will maintain practical sterility without corroding metals, without affecting wetting and cooling power, and at exceedingly low cost.

If dermatitis or foul cutting oil odors are impairing efficiency in your plant, send for booklet CG-6. Free to factory executives.

DACCULITOS.



Absenteeism

A plan reported as effective i n overcoming a b s e n teeism's critical threat to manpower has won wide approval among men responsible for military production. It attempts to approach the problem with an understanding of workers' the viewpoint.

Lew Shalett of Chicago, who developed it, explains the basic idea back of it, thus:

" Absenteeism is a minority problem. The vast majority of American men and women workers are onthe - job, fulltime, day-in. and day-out, doing their level best to help speed victory. But, the absentees, altho their total uumber is relatively small, do a great deal damage by

slowing up the production of their loyal fellow-workers.

"To reduce absenteeism, the wilful absentee must be appealed to at the point on which he is most vulnerable. Like all the rest of us, he would like to have the good esteem of his fellowworkers. Consequently, one of the aims of this plan is to make a worker feel that if he stays away from the job, regardless of whether it's simply to take-a-day-off, or because of a diffi-

SPEED UP LIGHT TURNING AS WELL AS GRINDING ROTARY MODEL PERMANENT MAGNET TYPE Transferred easily from machine to machine or machine to bench-especially useful for pieces difficult to hold in chuck jaws. Catalog of full line on request. No Wires-No Heating-No Operating Costs. Brown & Sharpe. Mfg. Co., Providence, R. I., U. S. A. For sale only in the U. S. A. and its Ter-ritories and Canada. BROWN & SHAR

> cult transportation, food or household problem, his fellow-workers are pointing the finger of scorn at him. In short, that they look upon him as a deserter.

> As one of the most effective appeals in the series puts it, the man who stays away from the job may in fact be a murderer; because due to his absence, the war lasts longer — and American lives are lost—unnecessarily.

SIMPLIFIED INTERNAL GRINDING with the MAJESTIC INTERNAL GRINDER



An exceptionally wide range of internal grinding jobs can be handled on the New Majestic Internal Grinder. Its simplicity of design and ease of operation are features of utmost importance in providing maximum grinding output at low cost.

SPECIFICATIONS

Length of table, 48°. Swing over table, 10°. Travel of cross slide, 2½°. Precision dial graduated to .0001°. Precision bearing work head. Speeds—100, 225, 350 r.p.m.

Write for complete details contained in New Bulletin

Majestic Tool & Mfg. Co. 2948 E. Woodbridge Detroit, Mich.



THE CLEVELAND WIRE SPRING COMPANY . SHEET METAL DIVISION . CLEVELAND, OHIO

You have backed us up with quick shipments...

The THREADWELL distributor in YOUR area is your own personal threading tool expediter.

You need a certain size tap... and need it at once. Perhaps important production schedules and deliveries hang on a thread... the thread that must be cut by a certain size tap to finish a certain part of your order.

Call your THREADWELL distributor! He will give personal attention to your needs . . . and so will we.

Don't misunderstand us. We are up to our necks in high priority orders. We can't deliver anything you might need anytime. But we can and do give our personal attention to every order. Often this personal attention can break bottle-necks and get customers the tools they want when they want them.

THREADWELL TAP AND DIE CO., Greenfield, Mass., U.S.A.



Expediters

A force of expediters, who concede only that the "impossible takes a little more time to accomplish these days," is keeping supplies flowing so steadily to the war production lines of the Westinghouse Electric and Mfg. Co., that not one of its 25 principal manufacturing plants, has been closed down for a day for lack of necessary material.

Prime purpose of the expediter, explained Andrew H. Phelps, Vice President, is to keep the supply lines moving by offering full cooperation to each supplier. Often that means going to the supplier's supplier or farther down the supply ladder.

The staff cooperates with
suppliers who,
because of wartime dislocations, might lag
in shipments to
the Company
and thus slow
the production
lines.

Sometimes expediters are called to help even after apparatus has reached the production phase. A gear hobbing machine breakdown recently halted the cutting of teeth for a spiral gear needed immediately in blowers for nautical engines. An expediter found a gear hobbing machine of the right type, idle

in a large commercial laundry. Westinghouse engineers recalibrated the machine and it was put to work. The Navy got its blowers, on time.

These expediters, Mr. Phelps reported, frequently have personally delivered urgently needed parts, chartering planes and occasionally riding trucks to see that material arrived on time.

Expediters at Westinghouse include engineers, salesmen, graduates of the shops and members of the peacetime purchasing staff.

Revolving Tables

Revolving tables of various kinds and for various purposes are found thruout industry, and occasionally we find a new one making its appearance. One of the latest is a highly convenient unit for grinding and finishing small castings. It uses portable grinding wheel. In grinding such castings, a man what grinding he can while they are in o n e position. Then, instead of walking around to another position, he simply presses a pedal which releases the turntable. revolving the casting to the desired position further for grinding. Thus. he can grind all the way around a casting without moving out of his tracks.

A hooded, I
cross draft suction system is usually provided in connection with such a turntable to carry away the abrasive dirt.

In finishing and paint spraying turntables are often provided for revolving work in front of operator. Even if employed in such work, you probably have not encountered all the turntable types developed for this purpose. They vary as the work varies. Most of them are pivotally mounted at their center, underneath. For spraying



GITS BROS. MFG. CO.

1860 South Kilbourn Avenue . Chicago, Illinois

30 years of oil cup experience

heavy objects, one firm has a roller type turntable which sets close to the floor.

There are small turntables designed to be set on a bench. There are somewhat larger and taller ones for use in spray booths. There are stop-and-go types provided with either electric or air motors, arranged for pedal control. Some are turntable units for spray painting which allow table to revolve while tilted.



Speed Production Thru Education of Personnel

This Amazing Chart Makes Trigonometry Easy

> 40 equations quickly found. Eliminates errors. Determines angles & dimensions, without knowledge of higher math.

Right Triangle Reverse Side

Makes TRIGONOMETRY Easy

Machine Shop — Tool Die — Jig Bore — Patterns Layout — Inspection — Drafting

BREAK TIME-WASTING BOTTLENECKS with the TRIG-EASY CHART, for every man whose work requires solution of problems involving angles. Saves his own time and time of those who must wait for calculations.

Correct equation is always instantly found with TRIG-EASY, 18,000 in use today. Pays for itself every time used. You can speed production thru education of personnel. Send for TRIG-EASY today, and only 50c with complete instructions. MONEY-BACK GUARANTEE.

TRIG-EASY

E. H. NEEDHAM

DEPT. U. CULVER CITY. CALIF.

QUANTITY DISCOUNT TO INDUSTRIAL FIRMS

Screw Driving

In many cases among screwdriving jobs of today a good portable electric screwdriver is very helpful. Such tools are available in many different weights and models from many manufacturers. It is a simple matter to make suitable choice of a power tool of this kind. As for screwdriver bits for power tools, they are a specialty of some firms who do not make the powered tools.

One such firm makes a complete line of power screwdriver bits, both for Phillips recessed screws and for slotted head screws.
Not only do they
make both types
of bits in full
range of sizes, but
they supply them
for practically all
makes of electric,
pneumatic a n d
spiral screwdriv-

The same firm manufactures two hand - powered drivers for Phillips screws, one of the tools is used for general duty on such screws. The other one is adapted for driving hardened, selftapping screws. The latter have become very popular for certain lines of work.

Driving screws around a corner? Quite a chore, one would say at first thought. And yet, it has been successfully solved by more than one manufacturer. In the first place, there is a hand screwdriver, with a rather lengthy shaft of laminated wire. It provides what is in effect a

screwdriver with a flexible shaft. This shaft can be bent right around a corner. The handle is shockproof, so that it is good for electrical as well as other work.

The most remarkable thing for driving screws around a corner, perhaps, is a pneumatic device called a multipleangle tool. It has a swinging, geared head, pivotally adjustable thru the full 360 degrees of a circle. The head holds various tools, and is especially good for screwdriving at angles.

FOR Victory!

GALTER



DEPENDABLE PERFORMANCE Guaranteed

Plain Milling Cutters Side and Face

Taper Shank Cutters Spiral End Mills

Milling Cutters Stagger Tooth Side Milling Cutters Counterbores Countersinks

Shell End Mills T-Slot Cutters Reamers Hollow Mills Drills

At Your Service for Special Tools, Dies, Jigs and

At Your Service for Special Loois, Dies, Jigs and Fixtures Made to Your Exacting Requirements.

Write for prices on standard sizes or submit blueprints for special sizes.

Galter Manufacturing Co. 711 W. Lake Street - Chicago, III.



ON THE NEW ATLAS DIE-FILING MACHINES



Can be used for all kinds of die making. The overarm is constructed so that the file and saw attachments may be interchanged with little effort. The
holddown fingers are attached directly to the overarm. Working surface of the table, which tilts two
directions, is entirely clear. An improved type chuck,
consisting of movable hardened jaws, holds both
saws and files. Screw adjustment makes changes
easy and fast.

Price, complete with motor - \$125.00 Net

ATLAS EQUIPMENT CO.

103 S. Clinton St., Chicago, III.



Problem

How to weld the aluminum screw machine part to the light gauge aluminum sheet? With high temperature fusion welding, damage to the light sheet was common and costly . . . due to the high heat conductivity and low melting point of aluminum. A successful job required painstaking skill, thus making large scale production impossible.

Solution

Castolin Eutectic Low Temperature Walding Alloy #190 enables wer plants to messproduce thousands of items like these — without loss or damage. Castolin Eutectic Alloy #190 binds at 200°F below the melting point of the parent metal. It saves welding wire and gives a stronger, completely color matched joint requiring no after-machining or cleaning.

Alloy #210 for aluminum castings; #19 filler for aluminum castings.

New 36p. Welding Data Book B Write Today

EUTECTIC

WELDING ALLOYS COMPANY
SULE MANUFACTURER - CASTOLIN EUTECTIC WELDING ALLOYS
40 WORTH STREET, NEW YORK, N.Y.

Simplifying Contour Shaping

A recently issued Bulletin describes how Duplimatic, an automatic machine tool control, permits standard shapers to do high speed automatic shaping. The set-up as described and pictured in the bulletin apparently eliminates the necessity for extensive re-building of the original standard shaper. Copies of Bulletin No. 5 are available from Detroit Universal Duplicator Co., 723 E. Milwaukee Ave., Detroit, Mich.

Coolant for Aluminum

A special and unique type soluble cutting coolant for aluminum sand castings, zinc and aluminum die castings and soft metal alloys is Quaker A. M. Base, a product of Quaker Chemical Products Co., Conshohocken, Pa. It is mixed with water for application in which it instantly emulsifies in all proportions. This keeps the applied cost low while providing high cooling

Urges Atlantic

Charter Extension

Extension of the principles of the Atlantic Charter to make Americars engineering skill, as well as its raw materials, available to the post-war world was urged recently by C. A. Powell, engineering executive, Westinghouse Electric & Mig. Co., before the Rochester Section of A.I.E.E.

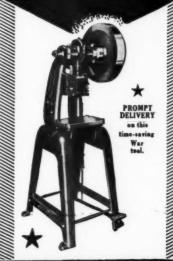
The easier it is made for the millions outside the United States to live decently, the less they are likely to want to fight every 25 years. By helping the smaller and poorer countries improve their industrial facilities, we help raise their standard of living, which in turn makes our own standard of living more secure.

The Atlantic Charler agreement of President Roosevelt and British Prime Minister Churchill, stating that raw materials must be made available to all nations on equal terms, is unquestionably a fundamental requirement of balanced economy, according to Mr. Powell.

3 ROUSSELLE PRESSES -- 41/2 TON - 10 TON - 15 TON

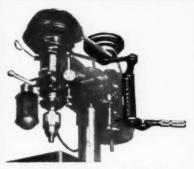
Rousselle Punch Presses are popular for Defense work because they combine real capacity, high speed and low cost. Equally important, you can have prompt shipment on any of the three sizes. No. 0, 4%-ton; No. 1, 10-ton (both open back inclinable); and the 15-ton Horn type. Write, wire or phone for data, name of nearest dealer.

Dealers a few choice territorie



DAVID J. ROSS CO.

INCREASE USE of POWER DRIVEN MACHINE TOOLS with Workmaster



Quick - Change Hi-Lo Power Drive

The Workmaster will more than triple the uses of drill presses and other power driven machines. Its flexibility and ease of "speed changing" will encourage operators to select the most efficient speed for each particular operation.

- Quickly attached using existing base plate holes
 Belt changes made with belts in loose position
- Requires only a few seconds time for any speed change Eliminates belt stretching, no forcing, no damaged pulleys
- Belt tensions automatically equalized on any speed Instant lock at any desired belt tension
- Instant lock at any desired belt tension
 Low speeds a necessity for countersinks, hole saws, fly cutters and large crills in metal working
- High speeds especially suitable for grinding, polishing and various carving operations

Write for Illustrated Folder.

Price complete with 4 step unit \$19.50

When ordering specify make and model of drill press or saw. Immediate Delivery.

GENERAL IRON & STEEL PRODUCTS
COMPANY

TULSA OKLAHOMA

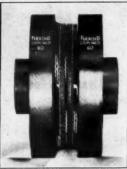
FlexoiD cou



WITH Flexible Thermoid Hardy Discs

STOCKS are carried in principal cities for

IMMEDIATE DELIVERY



Send for descriptive literature Telephone-MAin 9450

EXOID COUPLING CO., Div. THE SMITH POWER TRANSMISSION CO.

1545 E. 23rd Street

Cleveland, Ohio

LEADERS

Defining the successful foreman as a "lead-er of men," Wendell er of men," Nelson, General Electric Co., pointed out to the American Society of Mechanical Engineers, recently, that, today, he must also be a leader of women. Many jobs, formerly done by men, have been taken over by women.

The following suggestions to foremen have helped them in training women, cording to Nelson:

- 1. Avoid using chanical or technical terms without defining or explaining them.
- 2. Help overcome fear of the ma-chine by showing its limitations.
- 3. Emphasize that rules are made to be followed, and are only designed to protect the operator.
- 4. Explain in detail all the factors involved in one complete operation.

Relighting a Factory

A folder just published reviews the subject "Good Lighting-Better Work" from W.P.B.'s booklet Plant Efficiency. Discussion on how to obtain suitable priority for Conversion Lighting and illustrations on various factory - type lighting units make this folder interesting reading for the Plant Superintendent and Operating Executive. Address The Edwin F. Guth Co., 2615 Washington Ave., St. Louis, Mo.

War Products Laboratories

Announcement is made by The Curran Corp., Malden, Mass., of the opening of a new War Products Development Laboratory to be located in the Processing Plant, Prospect Mills, Lawrence, Mass. It is stated that the purpose of the Laboratory is to put its creative chemists on the development of both offensive and defensive war chemicals.



STANDARD CUTTERS

available from stock

REAMERS and many other cutting tools, formerly in the "special" class are now STANDARD with us. The majority of these STANDARD cutters is in stock most of the time. Our broad line often enables the consolidation of tool orders and saving of valuable time. Each W-S tool is genuine CARBOLOY tipped. The grade used is the one best suited to do a cutting job on the metals for which the tool was ordered. (Other brands of carbide can be specified.) Carbide tipped tools are not just a specialty with us ... we make them exclusively. You can expect and get uniform, high quality results with W-S tools. Write for new FREE Catalog 942 and latest prices. WENDT-SONIS COMPANY, HANNIBAL, MO.

SAVE TIME . . . wire or phone your requirements!







Use Johnson 130A for heat-treating hi-speed steel quickly. Counter-balanced door opens upward, allowing tools to be placed and removed without fully opening furnace door, thus preventing temperature drops. Lined with insulating refractory, carbofrax hearth and ¼ H. P blower. Available with 4 or 6 burners, according to tem-perature desired. 4-burner unit illustrated, \$295 complete with motor and blower. 6-burner job, \$325 com-plete with motor and blower. Prices F. O. B. Factory.

FREE Send for your Copy of the Johnson Catalog. It's free.

Johnson Gas Appliance Co. 589 E. Ave. NW., Cedar Rapids, Iowa

FLUXES FOR ALL NEEDS

No matter how tough your welding, brazing or silver soldering job may be, there's a Fluxine Flux to make perfect joints. Write a full explanation of your problems and Krembs will send a free sample of the proper Flux ... together with instructions for its use. Each of the 89 Fluxine Fluxes is scientifically compounded for specific jobs by the originators of non-bubbling, quick flowing fluxes. Fluxine

Fluxes meet U.S. Army, Navy and Air Corps specifications. Submit your fluxing problem today.

KREMBS AND CO. 676 W. Ohio St., Chicago, III

Chemists and Metallurgists Since 1875

For Silver Soldering Stainless Steel, with low melting Silver Solders. Most eco-nomical for brazing shells with Silver Solder rings.

Answers Navy Spec. No. 51-F-4A; Air Corps Spec. No. Corps Spec. No. 11316-A: Federal Ordnance Dept. Spec. No. AXS-500.

FLUXINE No. 43

U.S. PAT

"Plus Five" Tool

A patented new diamond tool is said to enable the operator to reset the point of the diamond himself - efficiently and speedily (in fractions of a minute). There is no need to send this type of tool back for resetting or to carry a reserve tool stock. According to the makers, the new tool stays on the job -affording dramatic economies in toolcost, time and effort. It is designed to take a high quality diamond, polLabor-Management, Post-War

The Labor-Manage-ment Committee movement, organized boost American war production, will live long after this emer-is the foregency, is the fore-cast of William G. Marshall, chairman of the WPB Labor-Management Committee and vice presi-dent of the Westing-house Electric and Mig. Co., Pittsburgh,

If impetus provided by the committees can be carried into peacetime production activities after the war, both labor and management will benefit immeasura-Marshall said recently.

"I spoke of labormanagement committees as a movement, Mr. Marshall contin-ued. "I believe it to be just that. The fundamental underlying principle is that Labor - Managem e n t Committee Work goes to the very heart of labormanagement cooperation. In my judg-ment the movement, whether designated by that name or some other, will live long after this emergency and on thru prosperous and depression years in varying de-grees of operation, from possible failure to certain success as economic conditions influence it.

ished by master craftsmen in the Larco factory. It is made so that on any of the 6 interchanges of point, the octahedron diamond is always in dead-center. It is sold with either one cap for a specified size diamond or with several caps to take several sizes. holder may be retained indefinitely for continuous use on dressing jobs. This tool is called the "Plus-Five" and it is a product of the Larco Tool Division of Louis A. Roselaar, with executive offices at 551 Fifth Ave., New York.



Manufactured By

CHICAGO DIE CASTING MFG.CO. 2513 W. MONROE ST., CHICAGO, ILL.

New York Office PATRON TRANSMISSION CO. 150 GRAND ST. N. Y. - N. Y.

Minneapolis Office H. A. HOLDEN CO. 300 4th AVE., So. Minneapolis, Minn.

CATALOG ON REQUEST



The NEW Rouse Hand Miller will help you speed up your small parts production, and enable you to get maximum output with inexperienced help.

The Rouse Hand Miller is a highspeed, ball bearing, motor driven machine for making light cuts in brass, aluminum and steel. It will handle efficiently small rounding and burring operations on steel and cast iron parts.

Priced low, the machine can be kept set-up for special operations with minimum machine-hour cost.

The Rouse Hand Miller is an accurate, sturdy machine, the development of many years of experience in producing fine small tools and parts. It has proved itself in the production of airplane parts, radio aquipment, motor parts, instruments, light ordnance, and imilar work. Prompt delivery can . Write, telepho

H. B. ROUSE & COMPANY 2214 North Wayne Avenue, Chicago PEER P-100

NEW WELDERS

OF WIDER ADAPTABILITY

Projection and Spot Welding

The new Peer P-50's and P-100's are automatic airoperated press type welders designed for both projection and spot welding,—big, rugged, versatile production tools adaptable to wide range of uses.

These welders incorporate new features that the tremendous use of welding in war-time production has brought to light. They speed production of sheet and structural steel assemblies, wire, rod and non-ferrous metals... Write for new Bulletin 50C which fully describes these latest models added to our welder line. PIER EQUIPMENT MFG. CO., 1468 Milton St., Beaton Harber Mich.

ACE WELDERS

Chrome Plating Reclaims Cylinders

Development of a process of chromeplating and reboring cylinders on a war product being produced by the Westinghouse Electric and Manufacturing Company, East Springfield, Mass., plant reclaimed 203 cylinders, saved 1400 pounds of critical material and more than \$1,000 in a three-month period.

The requirements of accuracy in size and smoothness of finish of the bore in these cylinders formerly resulted in a considerable scrap loss. Alec Ross. quality control foreman saw the opportunity and proposed the improvement and Colin Hastie, plating room foreman, developed the process being used with its consequent saving in time and material.

Brady-Penrod Model SP-400

A new Brady-Penrod centrifugal coolant pump, instantly self-priming, is ready for immediate delivery.

The makers assert that the new pump is not only extremely simple in design, but primes almost instantly on normal machine tool suction lifts. It also reprimes when the sump pump runs dry, as soon as it is refilled.

Model SP-400 is sturdily built, with the exclusive features and high quality found in other Brady-Penrod models, to withstand 24-hour service seven days a week. It will handle abrasives and steel chips. Flow of coolant is controlled by a valve at the discharge line, from a few drops per minute to full capacity of the pump without overloading the motor.

This new foot-mounted pump can be quickly installed on present machines or easily adapted to new machines. A free bulletin giving details and specifications is available from Brady-Penrod, Inc., 1210 West Second

St., Muncie. Ind.

NEW BINS



for assembling small parts

Floors slope to feed parts to front — end reaching and fumbling.

All-welded construction. Rolled, smooth edges. Bins taper toward front to form convenient semi-circle —keep all bins within easy reach. Nesting, locking construction for rigid set-ups, easily changed when necessary.

Two sizes—tapered or straight edges. Hoppers available for steady work.

Write Stackbin Corporation, 55 Troy St., Providence, R. I., for further details and low prices.

STACKBIN

"Stacked and



SYSTEM

Still Accessible"

STACKBIN CORP., Providence, R. I.

We have in stock the following high speed Taps, cut thread:



Please Send for Our Catalog.

PLUG		GUN	
SIZE	PRICE EACH	SIZE	PRICE EACH
6/32	\$.70	6/32	\$.80
8/32	.70	8/32	.80
10/32	.75	10/32	.85
10/24	.75	10/24	.85
12/24	.80	12/24	.85 .85 .90 .95
1/4 ×20	.85	1/4 x20	.95
5/16x18	.95	5/16x18	1.05
3/8 x16	1.10	3/8 x16	1.25
7/16×14	1.30	1/2 x13	1.70
7/16×20	1.30	Discount of 40%	
1/2 x13	1.55	off on all these	
9/16x18	1.85		taps

We also carry a large stock of H. S. Centre Drills, Jobbers, Wire Gage, letter size and Taper Shank high speed Drills, Hack Saw Blades, Emery Cloth, Tool Bits, Files and Diamond Dressers for Emery Wheels.

SID TOOL CO.

177 Mulberry St., New York, N. Y.

HE JOHNSON FRICTION CLUTCH

HAS FLOATING PLATES

THE NEW "MAXITORO" MULTIPLE DISC DESIGN

...for better clutch performance under ANY CONDITIONS

More than thirty years of successful applica-tion of IOHNSON FRICTION CLUTCHES to practically all power transmission demands is behind every recommendation made by our

Engineering Department.
You can, therefore, depend on better clutch performance regardless of the severity of operating condi-tions, when you bring your clutch problems to JOHNSON Engineers for study.

Among the operating features which contribute to better performance are sensitive starting, safety, cleanliness, quietness, efficiency and long life.

You incur no obligation in asking us to show specifically how you can improve power transmission on your machines. Just give us the details of your problem.

Write for Multiple Disc Clutch Catalog No. H-1 or consult "Thomas' Reg."



Double

"Floating Plates" in neutral



Single

Automobile gears made of cotton, indoor suns, clothes made of woodthey all may sound fantastic - but that's what we'll be having after the For shortwor. ages produced by war needs have stepped up Yankee ingenuity to a dizzy pace, declares an article in the March issue of Coronet magazine. March War deprivations are being compen-sated by a horde of inventions and ways of doing things. For, before doing an American will yield to the ersatz bogey - man, he'll wangle some sort of substitute out of what he has for what he hasn't and can't get.

American

Ingenuity

A Yank, declares Coronet, is not a magician, making something from something nothing, but he is a genius in making something out of something else.

HE CARLYLE JOHNSON MACHINE CO. MANCHESTER CON

Gas Cracking Unit

Designed to produce protective atmosphere during heat treatment of high carbon steels, especially those with molybdenum, this unit is fully detailed in bulletin No. HD 1042, offered by the makers, Hevi Duty Electric Co., Milwaukee. Unit is normally operated with the firm's gas preparation machine, which uses manufactured, natural or bottled gas. Cracking unit creates an atmosphere high in CO . . . 25 to 30% . . . free from CO2, and with controlled amount of hydrogen, it is said. Percentage of CO may be controlled, and hydrogen may be reduced to minimum. The machine is particularly indicated in cases where in treating tool steels a protective gas with high degree of CO content is desirable, with minimum of hydrogen or water, to prevent decarburization or scaling.



Three sizes with attachable blades 1/16 thick. Blades, tested for proper hardness stand up under hard usage. One Anderson blade is equal to an ordinary hand scraper reforged about 5 times. When worn out a new blade makes a new scraper. Making scrapers from old files is too costly; hand made and forged scrapers cost three to five times more. No need to grind an Anderson Blade . . . stoning is all that is required. Blade cuts faster, lasts longer and saves grinding time. Blades purchased by the dozen cost only about one-tenth the cost of making one by hand.

Write for complete information.

ANDERSON BROS. MFG. CO., 1917 Kishwaukee St., Rockford, Ill.

TORPEDO TYPE WHEEL DRESSERS



Many scientifically spaced layers of natural diamonds, securely anchored in a proven matrix that holds each stone securely, until the last stone is used. Unequalled in



performance and low-cost dressing. Available in four sizes, to meet your wheel dressing requirements.

ILLEY'S CARBIDE TOOL CO.

1340 W. Vernor Highway.

Detroit, Michigan



No vibration. Guerunteed shock-proof without ground wire. Practically unbreakable Bakelie case is shaped to fit the hand. Women doing war work use it long hours without fatigue. Only three parts; no screws. Four bearings scaled in grease retaining chambers. Tool mounts in stand, vise, or fathe and operates on AC or DC.

New COOLFLEX flexible shaft attachment extends full power and speed of the PRECISE 35 to the small, cool-running handpiece. Only PRECISE 35 offers this advanced feature.

PRECISE PRODUCTS CORPORATION 717 Racine St. + Racine, Wiscensin



THE PRECISE 35

1943 DoAll Calendar

The new DoAll calendar presents an instructive series of 12 lessons on contour cutting band saws. Overall size is 18-3/4x24-3/4". Sheets for 10 months are printed in 3 colors; 2 months in 4 colors; 1½" numerals are used for easy visibility in factories and classrooms.

Instructive, illustrated material is provided upon such important aspects of contour sawing as metallurgical research and chip formation, cutting of woods and soft metals, the DoAll acid test, heavy machining, the use of the proper jigs and fixtures, the making of 3-dimensional shapes, pressure, solving cutting problems, supply and selection of proper saw band and the chip-making process.

Copies of this useful calendar are available without charge to factories, industrial apprentice schools, army and navy training schools, and schools and colleges offering technical training. Address requests to The DoAll Co., 1206 Des Plaines. III.

Induction Heat

High frequency induction heat, used in a brazing operation on certain parts for war goods produced by General Electric in the cast, has reduced time for the operation from 4 minutes to 40 seconds, and eliminated need of highly skilled help in the work.

"The brazing operation was previously done with torches," explains J. P. Jordan, of G-E radio, television and electronics dept. "Because a high quality joint was needed, only highly skilled skilled workers could be used. Great care had to be taken during operation and inspection. age time per joint was about 4 minutes. With the application of electronic high frequency induction heat, time required for the operation was reduced to 40 seconds. Women operators are used, a uniform joint is achieved and, because is eliminated." of uniformity, inspec-

HART'S Divided Machine Vises



These Vises will hold work the full length of the table, if necessary. Useful on planer, milling machine, surface grinder or drill. They adapt themselves to any shape and can be used on sides of table as well as ends. The jaws are tool steel and hardened, the angle holding the work down on the table.



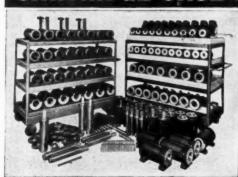
HART'S Milling Fixtures

These fixtures will make themselves popular and profitable in your shop. Easily kept clean to receive the work. May be used in either horizontal or vertical position. Suitable to hold round, hexagonal, octagonal, or square stock, aligning the work with the machine. Grip holds the work on the bottom as well as on the back. Shipped in pairs, unless otherwise ordered. Made in 4 sizes—¾8 to 4*.

HART MACHINE CO. 26 MATHER ST., DORCHESTER, BOSTON, MASS.

When writing for descrpitive circular kindly mention the BLUE BOOK.

CARTRIDGE CASE INSPECTION



All sizes from 30 caliber to 4. 78 brass or steel cartridge

All required types including Max. Profile Chamber Gages & Checking Plugs.

System Includes:
NEW GAGES
GAGE INSPECTION SERVICE
GAGE RECONDITIONING SERVICE

Write for prices and full details, mentioning your size requirements



Reg. U. S. Pat. Off.

QUALITY TOOL & DIE CO.

NOBLE & VERMONT STS.
INDIANAPOLIS. INDIANA
LINCOLN 1988-LINCOLN 1966

John Sharper Cutting John Sharper Cutting Faster Lopping TRY IMPRICATE DIAMOND DUST

Recommended for fast lapping of tungsten carbide dies and tools, also for lapping gauges and similar jobs high grade African bort, crushed and scientifically graded by new and advanced methods, make American's diamond dust absolutely true to mesh and uniform throughout . . . it is the sharpest cutting and fastest lapping compound known to industry.

Sold in six standard meshes; the No. 1 is medium coarse, for roughing down; the No. 6 is a fine flour, for use where extremely smooth, high polished finish is desired. Unless otherwise specified, we ship diamond dust dry, ready to mix with oil . . . also sold in paste.



S-0-S.

Fifty-eight General Electric technicians who were rushed to Hawaii to help repair the Battleships California and West Virginia will receive Navy "E" pins in recognition of their efficiency, Rear Admiral William R. Furlong, commandant of the Pearl Harbor Navy Yard, has informed the Company.

The men, gathered from all parts of the country and dispatched to the scene by plane, train and boat, and every available means to enable them to meet this urgent request, repaired propulsion equipment of the two big vessels. These were damaged so severely in the Japanese attack, the Navy has disclosed, that they settled to the bottom with their decks awash.

The technicians, skilled armature winders, motor experts and supervisors were summoned by telephone from all parts of the country by G. E. and dispatched, some by plane, to Hawaii. The largest single group, 20 men from Schenectady. sped west in a special Pullman car. Five men were obtained from the Bureau of Power and Light in Los Angeles.

In charge of the three shifts at first were: Max A. Hinrichs, who flew from San Francisco. Jesse D. Gardner, whose past experience included construction of the

power plant at Stalingrad, Russia; and E. E. Carrier, who had installed electrical apparatus in Cuba, Mexico, Chile, Panama and Manila and the street railway system in Batavia, Java.

Hinrichs later became ill and his place was taken by Robert Haake, rushed to Pearl Harbor from Boulder Dam where he had been working on the installation of an 82,000-kilowatt generator.

At one point, a problem in replacement of material required the direction of Howard Maxwell, managing engineer, G.-E Induction Motor Dept.



PATENT APPLIED FOR

ABER

SPECIAL **Curved Tooth** MILLING CUTTERS

"CHATTERLESS FLOWING ACTION"

- Higher Speed (R.P.M.)
 Longer Cutting Surface
- Longer Life

There is no lapse of cutting contact. Each tooth begins to cut just as its predecessor is finishing its cut. The continuous shearing is known as "Chatterless Flowing Action." Smooth, accurate finishes are maintained. Increased speed (RPM) means increased production. Save time and money with ABER curved tooth milling cutters.

WRITE FOR LITERATURE

ABER ENGINEERING WORKS, INC., WATERFORD, WIS.



SHOP BOX (Straight side)

A Straight Side Shop Box with drop handle each end. Excellent for general use where stacking feature is not required.



STACKING BOX

An ideal all purpose shop box. Sturdy all welded construction. Skids act as positive stacking lock and re-inforce box at point of maximum wear.

STEEL BOXES

Immediate Shipment!

6" x 9" x 31/2"-20 ga..... 40c Ea. No. 202-8' x 12' x 4'-20 ga.....45c Ea.

No. 301-6" x 9" x 31/4"-20 ga...... 55c Ea. 8' x 12' x 4'-20 ga.....60c Ea.

F. O. B. Factory, Philadelphia

AMERICAN METAL WORKS, INC.

1502 GERMANTOWN AVE. PHILA., PA.

ATLANTIC

No. 2 Automatic Precision

SURFACE GRINDER



ATLANTIC MACHINERY NEW YORK, N. Y. 149 BROADWAY.

THE BRITISH publication Listener, quotes Dr. Julian Huxley in this inter-esting definition of science, says West-inghouse Research: "The scientist isn't a witch - doctor, science isn't and eoma sort of magic. It was my grandfather who only organized common sense. It's true that when it is highly organized reaches out far beyond the ordinary common sense of the day; but common sense is its basis the true common sense that doesn't make up its opinions out of its own head, which always means taking prejudices and wishes for truth, but is constantly testing its ideas and its conclusions against hard fact by means of careful observation and contrasted experiment.

Lubrication

It's novel, this compact 64-page file card style catalog for 3 x 5 desk file. It lists lubricating problems and gives the answers. Covers a wide variety of lubricants including related products compounds, etc. Purpose is to aid users of lubricants to make proper product selection. Those interested are invited to write for a copy to Wells Petroleum Co., 816 Haines St., Chicago,

Airport Runway Lighting

For control of airport runway lighting, a new line of switches including the runway selector switch and the brightness selector switch are nounced by Westinghouse Electric & Mfg. Co., Dept. 7-N-20, East Pittsburgh,

Similar in appearance and construction, both types incorporate mechanically interlocked preset switches.

GRAHAM MULTI-PURPOSE VISE



With special V-jaws, shell jaws, stops, drill guides, etc., this vise puts a ready-made jig on your drill press, radial, shaper, miller, grinder, planer. Also sold plain, drilled for attachments.

KNURL HOLDER FITTING LATHE TURRET



Using only straight-cut knurls, this tool gives a wide variety of straight, spiral and checkered patterns. Capacity up to 2½° dia. of work.

Request Illustrated Price Circulars

GRAHAM MFG. CO.

57 BRIDGE ST. EAST GREENWICH, R. I.



PADDOCK Ball Bearing

BANDSAW GUIDES

Reduce Blade Breakage Increase Production

Easily adjusted to all sizes of blades to 11/2 wide.

Recommended for new and old machines running at any speed cutting all materials.

Shipped on 10 day approval

PADDOCK TOOL CO.
1418 Walnut St., Kansas City, Mo.

KANTI-LEVER COUPLINGS

THEY HELP YOU Maintain Peak Production

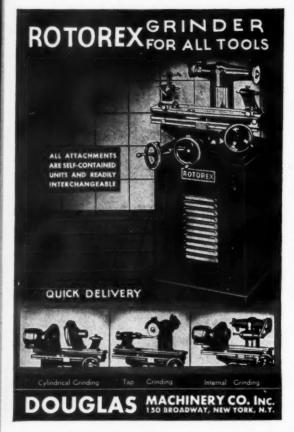
With your machines now forced to the limit to gain peak output, the necessity of stopping for repairs becomes much greater. You can prevent many of these costly interruptions of production by using KANTI-LEVER Couplings, for they have a scientifically designed Cushion Torque that absorbs sudden load shock and torsional vibration - the two main causes of wear fatigue and failure of machinery. The KANTI-LEVER is different from any other type and gives your machine a protection that is vitally needed under present abnormal conditions. See cut showing 70 KANTI-LEVERS that have proved invaluable to their user by protecting the driven machines and enabling steady production for over 18 years.

Send for Bulletin No. 28-B
Describing

Kanti-Lever Couplings



BROWN ENGINEERING CO. 126 N. THIRD SI READING, PA



New Manganese Alloy

Eighteen tons of scarce metals will be saved in the manufacture of General Electric war products this year, thanks to a new managanese alloy.

The new alloy will free 10 tons of nickel. 7 tons of chromium and almost one ton of tin for other war uses. All three metals are listed by WPB as "inadequate for war and most essential uses" while manganese, the substitution of which makes the saving possible, is available in adequate quantities.

The new alloy replaces a formula which called for 18% chromium, 8% nickel and the remainder iron. Either alloy requires a covering to prevent rust, and for the tin coating previously used, a lead coating has been substituted.

Adequate supplies of lead are available.

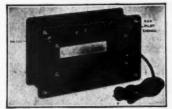
Replacing Carbon "Tet"

Cory Snow, 739 Boyleston St., Boston, discloses development of a unique solvent by the New War Products Development Laboratory of his client. The Curran Corp., as a substitute for Carbon Tetrachloride now widely used for cleaning by war plants processing metal parts. The newly developed solvent is described by the company's research director as a volatile, water-white methalated hydrocarbon solvent which evaporates and is characterized by its

quick and powerful cleaning as well as dissolving action on gums, oxidized oils, burnishing compounds, etc.

The new product is said to be 14 times faster than naptha in cutting gummy and tarry dirt. It is a "Non-Polar" Solvent and unlike the chlorinated solvents, induces no corrosive or rusting tendency of ferrous metals; also is said to be much less toxic than Carbon Tetrachloride which it is intended to replace. It is also said to be substantially lower in cost.

AMC DEMAGNETIZER A TOOL ROOM NECESSITY



Every tool room needs this simple, portable, sturdy demagnetizer. Small parts passed through the powerful AMC field are instantly demagnetized. Large, flat surfaces can be demagnetized by sliding the device over the surface.

Price is only \$32.50, complete as shown.

Write for full information.

ALOFS MFG. CO., Grand Rapids, Mich.

DANLY P

PRECISION DIE SETS



PRECISION

Danly Commercial Sets Danly Special Sets

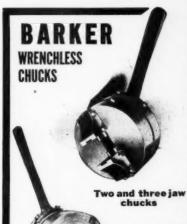
Means Greater
Accuracy
In Your
Production

DANLY MACHINE SPECIALTIES, INC.

2100 S. 52nd Avonue, Chicoge, III.

MILWAUKEE • LONG ISLAND CITY, N. Y.
DAYTON • DETROIT • ROCHESTER
CLEVELAND • PHILADELPHIA
Ducommun Metals & Supply Co.
Los Angeles • San Francisco

DANLY PRECISION SETS



The BARKER Wrenchless CHUCK can be adapted to any type of work that may be done on turrets, engine lathes.

semi-automatics or pipe threading and cutting off machines. They require no accessories to install, and a quick movement of the lever releases or grips the work.

Users everywhere are getting high percentage increases in production. Well adapted for a diversified line, from small brass castings to forgings.

Write for Catalog

THOMAS HOIST CO.

Chuck Division

24 So. Hoyne Ave.

CHICAGO,

ILLINOIS

4 of the many ways . . . SLOTMASTER can be used to save TOOLS & SET-UPS

Left: Set-up e cutting a e in an

Below: Set-up er cutting an internal goar

SLOTMASTER can be used on any round or flat-on round over-arm milling machine and will do precision work that normally requires a multi-thousand dollar machine all of the working parts are of tool stael, heat treated). It takes but little time to change over from one head to the other... the stroke of the ram is adjustable from 0 to 4" . . the speeds range from 50 to 250 to 4" . . the speeds range from 50 to 250 s.p.m. The tool holder is of the clapper box s.p.m. The tool holder is of the clapper box type and can be turned in any position. SLOTMASTER comes 'complete with pulleys, motor, mounting bracket, abc. Send for 4-page catalog—qive specifications of the milling machines you wish to equip. Immediate deliveries on high priorities.





Experimental Tool & Die Co. 12607 Greiner Detroit, Michigan



Lamps Drafted for War

Automobile headlights, small household bulbs and some 200 other lamps designed for peacetime uses have been drafted for important jobs on the war fronts, engineers at the Westinghouse lamp division have disclosed.

Sealed - beam auto headlamps, first developed several years ago, now are being used for more than 30 different military applications. Your 1943 au-to's headlight now can be found serving as an airplane landing light or showing the way for an Army tank.

Small household lamps built into special reflectors and wired in long strings - Christmas tree fashion—can be laid out in a few minutes to mark an emergency landing field.

Westinghouse machinery that formerly turned out tiny Christmas tree bulbs now produces gunsight lamps that show American gunners their targets with clarity. More than 20 types of these lamps are produced.

The sealed beam headlight, now used as a retractable airplane landing light. has been made 10 times as bright as was its auto contemporary. Made entirely of glass. this 600 watt lamp consists of a reflecting surface, filament and lens sealed into one permanent unit.

The inner surface of this glass reflector is given a fine coating of alumi-

num one-thousandth the thickness of a human hair. This means a big saving in aluminum over automobile headlamps with all-metal reflectors, used several years ago. The wire filament of a sealed beam lamp instead of being enclosed in a small bulb, is contained in larger space between the lamp's reflecting surface and the lens. The glass bulb is eliminated and a filament put inside the headlamp itself.

This gives nearly 50 times as much area on which evaporating tungsten can condense. It is tungsten evaporating that blackens the ordinary lamp.



KEEP 24-HOUR PRODUCTION GOING ANY SPEED, WITH DEPENDABLE

SPIEGEL Coolant PUMPS

Flow Control valve at operating point. Shut off without injury to pump or motor.

COOLANT TANK
LEVEL GUASE

INSTANTLY REMOVABLE INTAKE STRAINER

PUMP: Bronze fitted iron, open impeller single suction. Removable Strainer. MOTOR: ½ h.p. thrust-protected. ¼ h.p. optional.

PRICE: \$63.95 with % h.p. motor. Motors for all types of current available.

No bearings. No metalto-metal. No packing, no leaking. NO CLOG-GING.

Model FS-5 SPIEGEL CENTRIFUGAL

Capacity 500 GPH

Comes complete with 7-gal. 20"x12"x7" corrosion-resistant tank, motor, switch, neoprene hose, control valve, cord and plug, ready to use. Insures smoothest continuous operation on all work requiring coolant. Get full description of this unequalled pump.

Capacities 100 to 1500 GPH.

Mystery Solved

Rentschler. Dr. Director of Research, Lamp Divi-sion. Westinghouse Electric & Mfg. Co., Bloomfield, N. J., reports results of experiments to unravel one of the unsolved mysteries of electronics, namely, how particles tiny matter called electrons are emitted from metals to set up a flow of current inside such tubes as those for radio and X-ray.

Experiments during the last eight years have led to the conclusion that atoms of gas-oxygen, hydrogen or nitrogen — actual-ly dissolve in the crystalline structure of some metals just as salt dissolves in water. These gas particles then 'loosen' the this electrons in structure, causing them to be emitted from the metal more readily when heat or light is applied.

"This explanation." Dr. Rentschler declared,
"should result in
longerlasting tubes
and accomplish important savings in
the size and number of electric batteries, generators,
etc.

G. B. SPIEGEL CORPORATION

3956 CALUMET AVENUE

CHICAGO, ILL.



Cataway of Model 1250

STOP DUST

with NEW Model 1250 DUSTKOP

For CARBIDE TOOL GRINDERS . . . SURFACE GRINDERS . . . DISC GRINDERS . . . SANDERS CUT-OFFS. Entirely self-contained DUSTKOP has 1½ hp motor, multiple-blade fan, cyclone and filter, is portable, compact. Write for Bulletin A-100. See DUSTKOP in operation, Booth 120, A. S. T. E. Exhibition, Milwaukee.

AGET-DETROIT COMPANY 2042 Book Bldg. CAdillac 3090 Detroit

MORE POWER LESS WEIGHT



HOPPERS

In design of mag azine feeding mechanisms, much depends on weight of parts being handled, as well as their bulk. Weight determines the inertical parts display in resistance to being picked up by the feeding mechanism. Notched dials may be employed for feeding relatively heavy pieces of even sectioned stock, such as lengths of pipe or of shafting.

In others, swinding carrier arms may be employed to transfer workpieces from hopper to machine. In still other cases, where parts such as screws or bolts are being handled, they are agitated to cause the smaller bodies to drop through a slot.

Dayton Rogers Booklet

In many cases where metal stampings in small lots are needed, cost of necessary dies is prohibitive. Realizing this need, Dayton A. Rogers, engineer and stampings specialist, set out, in 1921, to supply such stampings to firms needing them.

Today, Dayton Rogers Mfg. Co., 2835 South 12th Ave., Minneapolis, is a flourishing business, noted for specialized and advanced methods, in which individual skill and craftsmanship still

play important parts.

"It is not unusual to see from 3,000 to 4,000 different orders in the die and press shop at one time, each case requiring new dies and special consideration," says the firm's new booklet Metal Stampings In Small Lots, authored by Dayton A. Rogers, himself.

The booklet gives details of the service, illustrated with blue prints and photographs, as well as explaining other products and services offered.



Write for Information

material. Extra tips are immediately replaceable by hand

SOUTHWEST MFG. CO.

1615 EAST FIRST ST. - Dept. B

because they are threaded.

SANTA ANA, CALIF.

Dairing

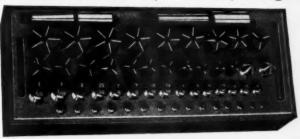
Counterbore Sets

A kit of these efficient tools eliminates costly delays in counterboring and spotfacing. Seven sets from which to choose. Each contains a logical selection of interchangeable counterborers, pilots and holders. Write fer prices and Bulletin C.

Set C-13, below, consists of 2 holders, 20 cutters ranging from $9/16^8$ to $1-3/4^5$; 28 pilots ranging from $9/32^8$ to $1-1/8^8$ and two countersinks, $7/8^9 \times 70^\circ$ and $7/8^9 \times 82^\circ$ are included. All neatly boxed with hard wood cover.

THE GAIRING TOOL CO.,

Detroit, Michigan





LYON

Hydraulic WELDING POSITIONER

REVOLVES | MANUALLY FULL 3600 (Power rota-

LIFTS 14' HYDRAULICALLY TILTS 900

This new Lyon unit is a great time-and moneysaver. Makes experienced welders more efficient. helps new operators-even women-do quality work. The Positioner eliminates crane work or jacking-up... has convenient hydraulic tilting and elevating table powered by motor-driven pump. Table revolves to any position through worm-geared hand-crank, selflocking at any point. For odd-shaped weldments, table may be removed and holding fixture substituted. Write us for new bulletin with full information and prices.

LYON-Raymond Corporation

MATERIAL HANDLING EQUIPMENT

216 Madison St.

Greene, N. Y.

Kerosene For Cleaning

Kerosene has long been recognized as a special cleaning agent, and there are a number of different ways in which it has been used to advantage. thing that attracted attention was a special cabinet-type piece of equipment arranged for washing parts with kerosene, under the action of strong kerosene jets provided by pumping. A charge of parts was placed in the cabinet. Lid of the liquid-tight cabinet was then closed. Closing the lid engaged contacts which started a pump and threw the kerosene jets into action inside. After a certain time interval had elapsed, the lid was opened, stopping the pump, so the parts could be removed and another charge substituted.

Kerosene guns, as found on the market, are highly effective for quick cleaning, using a kerosene spray under powerful air pressure. Some of them have a regulating screw for governing the degree of spray. They are especially good for cleaning bulky items that cannot be handled otherwice

If you have a number of small parts to be cleaned from time to time, which are difficult to handle individually. which may be easily lost, try putting them into

an old-fashioned corn popper, and swishing this back and forth by hand thru a small vat or container of kerosene. You will find that the job may be done easily and well. This is of especial value to the maintenance man who is called upon to deal with many small parts.

> Buy U. S. War Savings **Bonds and Stamps**

YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vine No.	Width of	Opens	Weight
	Jaw, Inches	Inches	Pounds
1D 2D	31/2	31/2 51/2	121/2

Do you need a vise of ANY type?

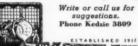
Write today for bulletins on
the extensive Yost line

YOST MFG. COMPANY
1335 SO. MAIN ST.
MEADVILLE, PENNSYLVANIA

1 tel



What is your steel trouble for Defense Tooling Program?



09

High Grade 2949 W. Harrison St., Chicago, Illinois



for example...



-where HASSALL nails are made especially for a specified requirement. Thousands of similar examples. Decimal Equivalents Chart free.

JOHN HASSALL, INC.

Established 1850

411 Oakland Street

Brooklyn, N. Y.





CENTER MASTER

Division CENTER SCOPE INSTRUMENT CO. 351 South La Brea Ave., Los Angeles

Suggestion Awards

War workers' production ideas saved 1,250,000 man-hours in General Electric plants during 1942, according to a statement by the company, announcing that a record \$158,943 was paid last year for 16,204 suggestions adopted of 53,945 submitted.

"Besides the time," the statement pointed out, "the suggestions adopted saved more than a million pounds of steel as well as large quantities of aluminum, copper, stainless steel, tin, chromium and other vital metals."

Two workers. Jerry Buccuzzo of Lynn, Mass., and Joseph Mizak of Bridgeport, Conn., received single awards of \$1200 each equaling an individual mark set in 1926. Last vear's totals are nearly twice those of 1929. previous the record year, when 8838 of 27,-991 suggestions earned \$104,272, and far ahead of the \$95,203 paid for 12,453 of 40,-834 suggestions in 1941.

Mr. Buccuzzo, who managed to enlist in the Navy when only 13 back in 1916, suggested a means of reducing the warm-up time in the testing of airplane superchargers, vital to high altitude flying.

Mr.Mizak, aG-E worker for 20 years, suggested a way of turning out certain ma-

rine parts in a single operation in place of the previous drilling, end milling and hand finishing. His idea saves scarce tool steel and frees skilled machinists for other work.

Spencer Frederick of Schenectady received \$1025 for two suggestions which together saved 647,000 pounds of scarce steel. His higher award, \$750, was matched by L. E. McElhiney of Lynn who found a way to save steel in the mass production of motors.

Many others were awarded worthwhile sums for practical ideas.



SAVE TIME AND WORRY

MARK PARTS, TOOLS, GAGES, DIES, FEXTURES, OR HARD FERROUS METAL & ALLOYS THES

3000



IN USE

WAY

3 Sizes to Meet All Requirements Send for Circulars and Prices

BREWSTER-SQUIRES CO.

42 Church St. New York





WINDER
Every shop and tool

strong, dependable unit
. . . quickly set up in any vise.

Increases production of hundreds of sizes of springs.

Write for illustrated folder, giving complete details

THE JOHN BLANER COMPANY Corner Meek & Elm Sts.

SHARON PENNSYLVANIA



EGONOMY MACHINE PROD. CO., 5207 Lawrence Ave., Chicago, III.



NO OTHER MILLER HAS ALL THESE FEATURES

Hydraulic Feed.
 Hand Feed.
 Vertical and Angle Spindle.
 High Spindle Speeds.
 Low Spindle Speeds.
 Low Spindle Speeds.
 Revolving Turret.
 Horgitudinal Travel.
 K"Cross Travel.
 Entire tolerances held to less than .001

ARMOR UNIVERSAL TURRET MILL

AIRCRAFT MACHINERY CORPORATION

Chrome Plated Tools

To make small tools last as long as possible while rendering efficient service, is without question a highly laudable objective today, not only from the standpoint of shop economy, but also from that of contributing to the war effort. Drills, reamers, taps, dies, punches, gages and cutters of various kinds may not only be salvaged from the standpoint of bringing them up to proper size and effectiveness again, af-

ter being worn, but some of the firms which specialize in hard chrome plating equipment are blazing a trail along the line of chrome plating such tools before their initial use, since such plating adds tremendously to their original life span.

One company claims that such tools may be plated to size, no subsequent grinding being required, and that they will have initial life anywhere from five to ten times that of the finest steel cutting edges.

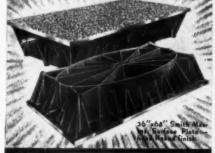
Quite a long time ago, it came to attention that a certain firm specializing in chromium applications w a s advocating use of chromium plated files, claiming that these files would last 3 to 9 times as long as unplated files. This firm also cited advantages to be obtained thru chrome plating

taps, drills, reamers, etc. Since dimensions of chrome-plated tools are maintained much better, there are many cases where greater accuracy can be achieved.

The application of chrome plating in salvaging worn surface plates is a late and noteworthy development. The process involves re-working of old worn surface to bring it into truth, and subsequent chrome-plating of the surface.

For Close Tolerance Assembly and Inspection SMITH MASTER SURFACE PLATES

Every Smith Surface Plate is a true Master Plate—with precision lapped surface, relieved by hand flaking to provide the maximum number of uniform bearing points to meet gauge makers' requirements and to prevent gauges and the like from freezing. On specifications requiring a total flatness tolerance of one ten-thousandths of an inch, medium size Smith Surface Plates have successfully met the test to the entire satisfaction of hard-to-please users. Tolerance on larger plates in proportion. A large variety of stand-ard sizes ranging from 8"x 12" to 46"x 120". For prices and de-livery write, wire or phone.



For Smith Precision Lapping Plates see our ad on page . . . 101

SMITH TOOL & ENGINEERING CO.

Precision Measuring Equipment

810 N. Sandusky Ave. Bucyrus, Ohio

PROMPT DELIVERIES ON STANDARD SIZES

U. S. Full Anti-Friction Bearing Hand Feed Milling Machine



A simple, powerful hand feed machine, with six spindle speeds ranging from 160 to 1460 R. P.M., making it suitable for all classes of light milling; the high speeds making it possible to use small end mills and keyseat cutters to full advantage, without use of supplementary high speed attachments.

SEND FOR GENERAL SPECIFICATIONS.

PROMPT DELIVERIES.

Our 1943 Catalog on small tools and machinery is ready for you. Send for a copy.

TRAVERS TOOL CO., LONG ISLAND CITY, N. Y.



Clark Adjustable Hole Cutters, make clean, precision cuts to any diameter from 3/" to 4/2", to depths of 3/" in stainless steel, pipe, plastics, hard fibre and other materials with ease, speed and accuracy. Clark 3-blade Adjustable Hole Cutters with additional High Speed Tool Bit Sets reduce inventory, save time and cash. Used with portable hand drills and various machine tools. State your hole cutting problems. Ask for new Bulletin. No. MTBB-3



Cutting Radial Surfaces

phere, unless new products or uses are developed placing added loads on supplies, MacKenzie said. His address gave a general picture of the intense development of tungsten carbide during recent years.

Important development to which he referred was the "hot press method" in which pressing and sintering operations are carried on simultaneously, materially expediting processing of cemented carbide large die nibs, etc., such as used in large shell dies. In this process the powder is placed in a closed mold, usually of graphite. Mold and contents are heated to sintering temperature, while sufficient pressure is imposed in one direction to overcome shrinking in the other two directions when a cold pressed compact is freely heated. Molds are ordinarily heated electrically to approximately sintering temperature used

in the cold press method. Heat may be applied indirectly from a resistance furnace or may be generated within the mold itself by resistance or by high frequency current. Suitable protection against oxidation serves to prevent undue deterioration of the mold. Pressures of 400 to 2500 psi. are commonly used.

Another process recently developed, according to Mr. MacKenzie, is that of extrusion capable of making rods, tubes, non-symmetrical cross sections, such as angles, flats, half-rounds, ovals, etc.

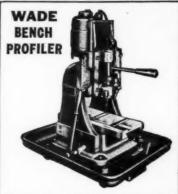
Cemented Carbide Tools

3424 SUNSET BOULEVARD, LOS ANGELES, CALIFORNIA

MANUFACTURERS ... PRECISION TOOLS ... PRECISION PARTS

Development on a mass production scale of tools and dies employing cemented tungsten carbide has assisted materially in solving the problem of tungsten supplies, Adam MacKenzie, Vice President, Carboloy Co., Inc., Detroit, told Ottawa section, Canadian Institute of Mining and Metallurgy, recently.

With development of new sources of tungsten, increase in output rates, etc., it is not expected that major shortages will develop in the Western Hemis-



For rapid production in recessing and slotting operations.

WADE TOOL CO.

WALTHAM,

-: MASS.

ALSO WADE BENCH LATHES AND HAND KNURLING TOOLS

NEDCO

Electric

SANDING—RUBBING MACHINES SOLVE YOUR SURFACING PROBLEM



THE NEDCO COMPANY
WALTHAM :-: MAS

NOW Speedup PRODUCTION WITH FAMCO PRESSES



This Famco Arbor Press is flaring insulation on armsture cores of Dumore Aeromotors...another example of how Famco Presses speed production in America's war plants. Only Famco Arbor Presses have adjustable gibs for perfect ram alignment. 40 stock sizes and models, floor and beach types. ½ to 15 tons pressure.

Write for complete facts on the full line of Famco Arbor and Foot Presses.

Fameo Machine Co. 1320—18th St. Racine, Wis.



Floor Arber Press

No. 15 Foot Pres





spindle capacity 8' x 32' table.

JACKSON

MACHINE & TOOL COMPANY SALES DIVISION 956 Roberts St. Jackson, Michigan

5 speed V-belt drive, sturdy 41/4" quill and 3/4"

Concentricity

Most of us know that a good way to check concentricity is to mount a member so it may be revolved, and then try first one and then the other component parts with a test indicator. If a point can be found where both show true by the indicator, they are concentric. There are occasional cases, however, where it may be desirable to test the approximate concentricity of a part, and where enough roughness will be present to prevent effective use of any indicator in the ordinary way. This has been overcome in some

cases, by interposition of a strip of steel or a finger, between the revolving part and the point of the indicator.

Where boring operations are in view, of course, the use of a pilot in a smaller hole, to steady the cut of a counterbore, will insure concentricity. This principle of operation is continually resorted to in one way or another.

Piloting of floating tool-holders has often been used for speeding work and insuring concentricity at the same time. For instance, it is highly important that holes and seats of tappet valves be absolutely concentric. One firm has produced many floating tool - holders suited for such work, and tools of piloted type to go with them.

The same general idea has been used in cases where it was necessary to cut an external thread on a round part which had a bore, to make the threading perfectly concentric with the bore. A self-opening diehead was used on a single spindle drill in one case. The diehead was held on a floating connection, and fitted with a pilot that entered the bore while the thread was being cut.

Holders for work or for tools that allow universal adjustment constitute one of the modern refinements which permit concentricity to be maintained without an extreme amount of work.

TO HELP YOU TEACH THE NEW-GRINDER HAND



how to get maximum service from your Diamond Tools—we have some effective training material. Send for it. No obligation.

KOEBEL DIAMOND TOOL CO. 9352 Grinnell Ave., Detroit

KAEBELITE DIAMOND TOOLS

Multi-Point, Multi-Set, Multi-Edge, and Single Set. Diamonds for All Industrial Purposes.

"TRU-V" BLOCKS



Why Not Save Time—by having enough V-Blocks available at all times in your shop to avoid the delays involved in make-shift set-ups and tie-ups?

"TRU-V" Cast-Iron Blocks are available in nine sizes—from 3½ to 10°, in three styles. Each block is carefully machined on all sides, with close limits held within .001° where required. A machined ledge on both sides provides for clamping on machine bed.

> Let us send descriptive bulletin. Or contact your mill supply dealer,

Oliver Motorcraft Corp. 2532 S. Wabash Ave., Chicago, III.

RECLINABLE POWER PRESSES



We manufacture a complete line of mechanical power presses, with sizes and types for every need in your shop.

Write for bulletins.

ZEH & HAHNEMANN CO. Newark, New Jersey

THE HOTEL PREFERRED HOTEL METROPOLE

A stopping place modern in every detail, yet maintaining a friendly atmosphere and hearty hospitality. Preferred by experienced travelers.

3-Dining Rooms. Garage. Rooms from \$1.75. With bath from \$2.50.

CINCINNATI, OHIO



problem.

Hammond offers YOU many different types in its wide line of Carbide Tool Grinders for rough and finish grinding, and the grinding of chip breaker grooves into Carbide Tools. Each type is modern — with up-to-the-minute features.

Act now — write for complete information. Hammond Grinders will help you maintain that high efficiency so necessary in the speeding-up of YOUR Arms Production.
"Beat that Delivery Promise" with Hammond Grinders and sharper

tools. ASK FOR BULLETIN 201.



Vibration

There are cases in machine design in which deliberately induced vibration is used to advantage. Such is the case with concrete vibrators, used for shaking down or solidifying concrete that has just been poured. Vibratory packers are used for shaking down loose materials being packed in containers. Vibratory units are designed for shaking hoppers.

In most cases, the problem is to get rid of vibration, especially in machines with high speed, performing delicate

operations.

At least two methods present themselves for getting rid of vibration. One is to isolate it, by interposing some material or element which will not transmit it. Another is to cure it by whatever means may available. With reference to isolation, units of rubber or cork are often used, as well as springs of different kinds.

Floating mechanical units have been used, which were very helpful. One or more firms have furnished cork mats or foundations which engines or other heavy machinery is installed, so they will not transmit their vibration to the floor. In one case, headstock and tailstock spindles of a splendid shoulder grinding machine were driven by fullfloating pulley units, designed to relieve spindles of vibration and pres-

sure from the belt.

There are instruments which measure vibration directly and allow it to be read, so that the modern builder of machinery need never be in the dark as to how his products are rating on this. There is at least one electrical vibrometer direct-reading to 0.0001 in, developed by a well known electrical manufacturer. Static balancing will not suffice for close work; a dynamic balancer is required.

BUY WAR BONDS AND STAMPS

Power transmission is by floating cushions, free instantly to de-



L-R Type "W" PAT. & PATS PEND. for duties, 2 to 2500 h.p. Get details on exclusive construction of

form and adjust to any load condition.



Why they most efficiently absorb shock, vibration, and correct misalignment. Catalog with free Selector Charts. Write

LOVEJOY FLEXIBLE COUPLING CO. 5026 W. Lake St. Chicago, III.



AUGMENT FLUORESCENT LIGHTING OVERHEAD

With Vimcolight Directly On the Work!

Enjoy still better lighting conditions encourage safer, surer production. Help employees reduce eye strain by installing even-glowing, non-glare Vimcolights. Used on hundreds of America's best known machine tools.

Now more than ever you need this help for TRAINING Tool and Die Makers

Widely used by many companies and trade schools throughout the U. S., it meets urgent need for a complete, up-to-date text for training new men, "refreshing" older men, or trouble-shooting in the tool room. Full of practical, "how to" information in easy shop language. It shows how to select tool steel; how to make tools; how to avoid trouble; how to improve tool performance, Low price of \$1.00 per copy makes it economical to use. Send \$1.00 for each copy you order (\$3.50 outside the U.S. A.).

TOOL STEEL SIMPLIFIED by Frank R. Palmer, Vice-President of The Carpenter Steel Company

315 pages - 205 illustrations \$1.00 postpaid in U. S. A. Elsewhere \$3.50

THE CARPENTER STEEL CO. READING, PA. Dept. 12E





Silver-Plated Bearings

In the production of silver-plated bearings for airplane motors, the rate of plating is said to be more than trebled by use of potassium cyanide, formerly imported from Europe but now made in this country by the Electrochemicals Dept. of E. I. du Pont de Nemours & Co.

Literally tons of silver are used each week in the fabrication of bearings which will withstand the high loads and terrific speeds demanded in modern wartime operations. According to

some authorities, air speeds would be reduced as much as 75 miles a n hour and loads would be cut substantially if silver - plated bearings we re not available.

Potassium salts now are recovered by re-crystallization from the vast Searles Lake salt deposits in the desert country of California. These salts provide the basic material from which potassium cyanide is manufactured at a nearby plant of the Du Pont Co.

In an electroplating bath potassium cyanide
not only increases the rate
at which silver
plate is deposited on the motor
bearings, but also gives required
heavier coatings
that are smooth,
firmly adherent,
fine grained and
easily machined
or burnished.

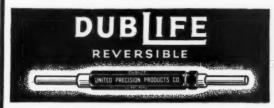
Coatings of silver deposited on the bearings, some of which are three to four inches in diameter, range from .03 to .05-in thick, whereas silver electrodeposits usually are measured in thousandths of an inch.

Potassium cyanide also is used in copper plating of war materials and as a nitriding agent in the surface hardening of tool steel.

"KEEP 'EM FLYING"



You always have a NEW Plug Gagewhen it is a



Both "Go" and "No Go" ends of DUBLIFE Gage reversible. Turn end for end, and you have NEW Gage! Plug secured in handle by bronze tapered collet. Twice the precision life. Accurate long after other gages are worn.



Armored against distortion by UPPCO Finish

Full line, DUBLIFE sizes .030 to 1" described in Catalog. Also other gages of American Gage Design to 41/2". Write

> Originators and Exclusive Manufacturers of **DUBLIFE Gages and UPPCO Finish.**

UNITED PRECISION PRODUCTS CO. 3522 West Belmont Ave., Chicago, Ill.

Red Pencil on Blueprints

Occasionally one receives a blueprint that has become faint from lying in the sun or in strong light, when the original fracing is not available for making a new print. In such cases, one can go over lines have become faint, using a sharp red pencil, thus making the lines readable, while dimensions that have become illegible may be scaled or com-puted, and boldly marked in with red pencil.

Red pencil has also been found very convenient in cases where it is desired to make a few minor changes in a print, where, excepting for those minor changes, a standard print may be used. Simply draw in the changes with a red pencil on the print, and let it be under-stood in the shop that red pencil lines on a print supersede the lines they displace. In the drafting room this saves much time that might be spent in making a large complicated drawing, and at the same time it leaves t h e standard tracina unaltered.



Shut Off Expense Caused by Slippage You Save Money on Every Installation

NEW LOW PRICED PRODUCTION LINE SOME OF SIZES Send for List—On the Shelf

Dla. Face Price 2 "x2 i" - \$1.25 2 i "x2 i" - 1.45 3 "x3 i" - 2.25 3 i "x3 i" - 2.55 Price Dia. Face 4 "x3 4 4 1 x5 1 "x4½"— 4.25 "x5 "— 4.75 6 "x5

Increase Production

We supply Fractional Dia. and Face Pulleys-From large casting stock. VACUUM CUP METAL PULLEY CO., INC. Detroit, Mich, 12535 Grand River Ave.,



THE FEDERAL PRESS CO., 803 DIVISION ST., ELKHART, INDIANA

Man-Power Problem

Output in many plants has been kept down below what it would have been because of high labor turnover and by the large number of absences.

The labor turnover in industry has been steadily rising for three years and in many plants has reached the 100 per cent level. This figure means that the number of persons leaving during the year is equivalent to the entire working force.

These persons must be replaced, and

new employees trained if production is to be maintained. The cost of training and the time required constitute a handicap to full production and to the most efficient use of the available working force.

Improved personnel policies and better training methods, as well as close control over the workers may be needed to achieve maximum production.

The war industries will require at least 20,000,000 workers, and from 32.500.000 to 35.-000,000 are necessary to supply the essential civilian needs. Including about 10.000.000 in the armed forces. the total number of persons at work will number close to 65,-000.000, or approximately one-

half the entire population.

plants. Write

for literature.

If this percentage is reached, a larger proportion of the people will be gainfully employed in industry, agriculture, and the military forces than ever before.

Production can be increased not only by employing more workers, but also by working them longer hours. The average work week in manufacturing has been increasing steadily for over a year.

(Courtesy LaSalle Extension University)

New Britain

Swivels 360 degrees horizontally, 100 degrees vertically, to give any angle or compound of angles. Write for Further Information

NEW BRITAIN TOOL & MFG. CO. NEW BRITAIN, CONN., U. S. A.

Enables the relatively unskilled to perform precision gaging . . .

COMTORPLUG

Expanding internal gaging to fractions of .0001

Sizes: 1/4" to 7" dia. and larger



ment-not a passing reading.

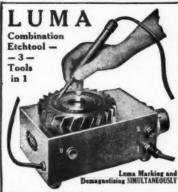
To fractions of .0001s, Comtorplug checks bores for size, out-of-round, front or back taper, barrel shape, bell mouth, etc. Relatively unskilled gagers get assured accuracy through automatic features of self-alignment and self-centering giving positive 2-point gaging. Widely used in ordnance, airplane, automotive, electrical industries.

REQUEST BULLETIN 27

THE COMTOR CO.

62 Rumford Ave.,

Waitham, Mass.



Writes on hardened steel - demagnetizes at the same time—with carbon point does light spot annealing and soldering jobs. Compact—easy to use—dependable.

Send for details-5-day FREE TRIAL OFFER!

Luma Electric Equipment Co. Dept. H-Main P. O. Box 132, Toledo, Ohio





In sizes from ¾° to 10' opening.
½° to 16' deep.

WRITE FOR CATALOG



The Cincinnati Tool Co.

Cincinnati, Ohio 1945 Waverly Ave.



Perishable tools—so difficult to obtain today—last longer, cut better and quicker if kept always sharp. The HILCO Universal Tool & Cutter-Grinder costs only \$495.00 F.O.B. Chicago, complete with Universal Index Dividing Head, step collars, ¼ hp. 110 volt universal motor, index fingers, grinding wheels, etc. Quick delivery.

Write for circular and full specifications.

BERCO MANUFACTURING CO. Chicago, III.

Buffing

Problems in buffing are nearly always polishing problems, tho there are other duties besides polishing as such, for which buffing wheels are called into service. For instance, parts that have been heat-treated and are to be tested for hardness, have clean bright spots buffed on them, and the tests are made on such spots. Likewise, it may prove profitable to spot-buff work at locations where soldered connections are to be made, or for other mechanical reasons.

On practically all such applications, a l l t h a t i s involved is a buffing wheel on an ordinary wheel stand, the work being advanced freehand. In fact, such a simple setup is found also for many types of polishing work of extremely complex or difficult type, which cannot be b u f f e d automatically.

In most cases, however, where work of any appreciable size is to be buffed, the buffing wheel must be mounted on an extended spindle to give plenty of swinging clearance for the work.

One firm, which builds a wide variety of buffing and polishing lathes, also furnishes grinding wheel stands and buffing mation, the end of a double - end unit which carries the grinding wheel being held quite close

to the floor pedestal or support, and the other end, for the buffing wheel, being extended quite a bit farther.

Buffing lathes are now made by some of the foremost builders, which incorporate a variable speed device, allowing a speed range on the buffing wheels anywhere from 1500 to 3000 r.p.m. The speed is changed by the simple turning of a dial at the top of the machine. As wheels wear and become smaller in diameter, the r.p.m. can be stepped up to keep the peripheral speed practically constant.



ETCHERS and DEMAGNETIZERS

Let us tell you the many advantages of our new D. C. and A. C. models now available. Also, see our new line of Midget Chucks.

Send TODAY for latest circulars

PRINTZ ELECTRIC CO.
14595 KENTUCKY AVE.,
DETROIT. MICHIGAN

Signode Anchor Strap



TIME · MATERIAL · WEIGHT

Machinery and Machine Tool Manufacturers are using Signode Anchor Strap for reinforcing and anchoring machine parts and tools in boxes, crates and for skids.

Write us for facts how to make critical lumber go further, cut freight weight and add to protection of shipments.

SIGNODE STEEL STRAPPING CO.
2618 N. Western Ave., Chicago, III.
Representatives Servicing Industrial Areas

SIGNODE



SAFETY WEDGE GRIP

HOLDERS FOR SERIAL NUMBERING

- Furnished with any Size Character
- Deeper Impressions
- No Spalling
- No Mushrooming
- Positive Grip
- Safety Snap Feature for Quick Change of Type Inserts



Write for prices and literature

M. E. CUNNINGHAM CO.

228 E. Carson St.

Pittsburgh, Pa.

Finest DOWNTOWN Location

The Ohio provides you with greater comfort and a cordial atmosphere. Good beds, good food and economical rates assure you of the best in hotel enjoyment during your stay at Hotel Ohio.

400 ROOMS FROM \$2.

Aonwäżiomu

ONE OF THE ALBERT PICK HOTELS



Electronic Tubes

The electronic tube, used mostly for radio until a few years ago, is now finding increased application in war plants thruout the nation. This was pointed out in a talk to the American Marketing Association in New York City recently, by Dr. W. R. G. Baker, G-E vice president in charge of the company's Radio, Television and Electronics Dept.

Electronic motor control, for example, boosts the war production of machine tools by as much as 50 per cent,

he explained. Electronic control for resistance welding is speeding the production of aluminum planes. Electronic rectifiers are helping to produce millions of tons of aluminum and magnesium. Electric control de-vices are helping to tinplate 50 per cent faster and with a saving of one-third of the precious tin.

To the consumer electronics field radio, television. a n d FM — Dr. Baker said that war research and engineering will bring many improvements. But. he cautioned, consumers should not be led to believe that the day after peace comes they will be able to buy television and FM radio sets for \$9.95. It will take a long time to reduce new wartime knowledge to peacetime practice, and it won't take place over-

night, he said. If the war lasts until 1945, probably only 50 per cent of the nation's radio receivers will be in operation. This will mean a big demand for receivers when peace comes, and will keep workers employed while engineers are converting their new wartime knowledge to better peacetime products, Dr. Baker explained.

When the electronics industry returns to making consumer peacetime products, it will start where it left off when it converted to war production, the speaker said.

Rotary Files

These files are available in a number of different styles and sizes, in either High Carbon Steel or High Speed Steel.

Send for catalog showing a wide variety of standard shapes and special shapes. Perhaps we have what you want in stock, if not, we can grind it.

The Rotary File Co.



Hand Cut

If you have need for special shape Files, we shall be glad to submit the desired File for your approval and trial upon receipt of a sample or sketch.

This service is designed especially for your convenience, for which we make no charge.

STRATFORD, CONNECTICUT



FELL PRECISION



A precision "all-way" level for use in machine tended building, setting up and maintenance, whether for establishment of level working surfaces or for the acqurate checking of straightness where true level itself is not required.

Graduations are in .0005* per foot and form squares about a circular bubble, thus giving coordinate readings and showing the direction and amount of slope, if any. Made in two sizes—5½* x12*; 3½*x6*.

Write TODAY for bulletin giving full details.

Wm. B. FELL COMPANY 700 South St. Rockford, III.



For War Production

KARELSEN'S DIAMONDS KEEP THE WHEELS OF INDUSTRY TRUE

4 KT. TO 10 KT.

GRAFTON WISCONSIN

SEND FOR PRICES SPECIFY HOLDER

IF ITS MADE OF DIAMOND.

IMMEDIATE DELIVERY

DIAMOND POINTED EMERY WHEEL DRESSERS

AND DIAMOND TOOLS FOR EVERY PURPOSE.

SALESMEN WANTED

Big demand for our products. State qualifications fully. All information in confidence—Write—Some territories still available.

E. KARELSEN, INC. Tel. VAN. 4-5888 St., N.Y., N. Y.

MAKE YOUR OWN
CUTTING TOOLS

with the new

COLMONOY WCR ALLOYS

Bridge the gap between high speed steel and the carbides. Reclaim old, and make new cutting tools by welding. The process is simple.

To fabricate a typical tool-

- 1. Undercut carbon steel shank, leaving a fillet for ease in welding.
- 2. Fill undercut, using ordinary hard facing welding procedure.
- 3. Hot wipe, to approximate shape, to save grinding.
- Wetgrind, using green silicon carbide rough and finish wheels.



WRITE FOR LITERATURE

Immediate delivery of all grades of W C R Alloys at all branches.

WALL-COLMONOY CORP.

720 Fisher Bldg.,

Detroit, Mich.

Branches in New York City, Blasdell, N. Y., Chicago, Tulsa, Los Angeles, and in Canada

Dust Explosions Codes

The N. F. P. A. has recently published a 160 page book, which includes the 15 American Standard Codes; a statement of the fundamental principles of dust explosion prevention in industrial plants, and a record of some 780 dust explosions which have occurred in U. S.

Among specific industries for which codes are included are: woodworking plants; wood flour mfg. establishments: flour and feed mills; spice grinding plants; starch factories; pulverizing systems for sugar and cocoa: terminal grain elevators; country grain elevators: and suggested good practice for the application of suction and venting in grain elevators and storage units. Also included is a standard method of using carbon dioxide or other inert gases for prevention of explosions and fires.

Codes were prepared by the N. F. P. A. Committee on Dust **Explosion Hazards** under the chairmanship of Dr. David J. Price of the U.S. Department of Agriculture. They are a revision in certain details of the 1940 edition. They specify measures that will provide fire safety witho u t prohibitive expense or undue inconvenience.

All codes are purely advisory as far as N. F. P. A. is concerned. They have great influence, however, because after their adoption by the Association they are largely used as the basis of state and municipal legislation and fire insurance requirements.

160 pages, suitably illustrated with drawings, and bound with substantial brown paper covers. Price \$1.00 postpaid. National Fire Protection Association, 60 Batterymarch St., Boston.





MOREY MACHINERY CO., INC.



Band and Disc Grinder

The latest in pedestal type grinders. Actually two machines in one! 14* disc for all rough work . . . 6x48* band for finishing. Precision-built to meet war-time production standards—quickly, conomically!



This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre... at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36¼ band. The ideal portable unit!

Other styles and sizes in New Booklet on Finishing—Write Today

WALLS SALES CORP. 96 Warren St., New York, N. Y.

New York, N. Y.

Provision for increased

clearance between spin-

dles and table.

Ask for Bulletin 680-A

410 Broome Street

THIS HONEYCOMB BASE IS THE Pattern of PRECISION In Mechanite Metal SURFACE PLATES

Every factor contributing to accuracy has been incorporated into these surface plates. They are up to one-third heavier than any of the quality surface plates. The honeycomb design base distributes this weight evenly over the entire surface. Hand scraped to extremely close tolerances, of uniform texture, fine close grain, unusual

Other sizes to specification. Angle plates and straight edges of Meehanite metal also available. Good deliveries on most sizes. Write for folder,

strength and solidarity.

Just off the press-Precision Production Tool Catalog No. 42

Send today for Precision Production Tool Catalog No. 42

SIZES	APPROX. WT.	HEIGHT	TOLERANCE	NET PRICE
6 x 6	II LBS.	21/2"	.1000.	\$ 19.00
8 x 12	38 "	31/2"	.1000.	35.00
9 x 12	40 "	31/2"	.0001"	35.00
12 x 12		31/2"	.0001"	43.00
12 x 18	85 "	411	.1800.	68.00
18 x 18	140 **	41/210	.0001//	98.00
18 x 24	200 **	500	.0001"	133.00
18 x 36	310 "	61/410	.0002"	174.00
20 x 30	325 "	51/411	.00025**	190.50
24 × 24	334 **	61/219	.00025//	180.00
24 x 36	475 "	700	.00025#	275.00
30 x 36	510 **	711	.00025//	345.00
30 x 60	1425 12	100	.00025//	596.50
31 x 78	2100 "	100	.00032	827.00
48 x 96	6000 "	12"	.0005**	1468.00

200 CHURCH ST. NEW YORK, N. Y.

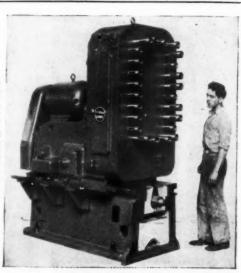
ACME TOOL COMPANY

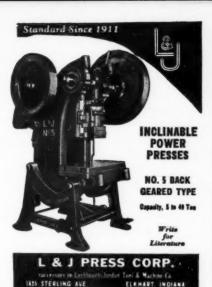
The drilling units furnished by W. F. and John Barnes Co., Rock-ford, Ill., for the drilling of 360° Revolving Turrets on the M-4 Medium Tanks are of their standard design equipped with special multi-spindle heads.
One unit has 25 spindles and

One unit has 25 spindles and the other has 24 spindles. The spindles on the 24-spindle head are arranged with 18 spindles equally spaced about a circle

and 6 spindles in a cluster.

Both heads are equipped with anti-friction bearings, hardened alloy steel gears, and heat-treated spindles and shafts.







SAVE Labor and Time

Eliminate heavy lifting. Cut handling Table costs.

swivels and locks in any position. Can be varied 151/2" by slight foot pressure, leav-ing operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

Send TODAY for illustrated catalog No. 2.

MIDWEST TOOL & ENG. CO. 112 Webster St., Dayton, Ohio



LITTELL Air-Blast Valve automatically ejects pieces from punch presses. Keeps operator's hand out of danger zone. Increases safety and speed. Air nozale quickly adjustable.

Other Littell safety devices include Pres-Vac Safety Feeders for picking up and feeding flat-surfaced materials; also, air-operated Mechanical Pickers for feeding pieces that vacuum lift will not pick up. not pick up.

not pick up.

Littell makes a complete line of Automatic
Reels, Feeds, Straighteners,
Scrap Cutters, etc.

REQUEST
BULLETINS

F.J. LITTELL MACHINE CO 4153 RAVENSWOOD AVE CHICAGO

Modernized . . .

Beautified .

Buffalo's Most Congenial Hotel

Today, you'll enjoy your stay at Hotel Lafayette more than ever! Extensively remodeled, and redecorated, this fine hotel offers new convenience and comfort -but the friendly hospitality is the same as ever. Excellent food, home-like rooms, reasonable prices. And remember: Hotel Lafayette is Buffalo's most centrally located hotel. Moderate rates: Single, \$2.75 up; Double, \$4.50 up; special rates for 4 or more.

Write for Folder J.

HOTEL LAFAYETTE

K. A. KELLY, Manager BUFFALO, N. Y.

POWDERED DIAMONDS

FOR FAST

Cutting • Lapping • Polishing

MADE... Only of selected hard, tough African and Brazilian diamonds crushed to produce maximum abrasive qualities of uniform strength.

SIZEO... Scientifically in ten standard sizes to meet general requirements — or meshed exactly to individual specifications,

FURNISHED... In dry powder form — or in compound form in which the diamond powder is combined with lubricants or cutting oils.

Guaranteed-weight-quality-purity.

Lowest prices - and immediate delivery of any quantity.

Send for data on diamond powder, for cutting, lapping and olishing.

J. L. HANIFEN

Diamonds for Industrial Use 410 EAST 57th ST., NEW YORK, N.Y.

STEEGE MOTOR DRIVES FOR DEFENSE GUARANTEED FOR FIVE YEARS

No chance of breakdown, doing a



good job powering machines for defense production. No noise, floating cone, results 100% power. 8 years of production

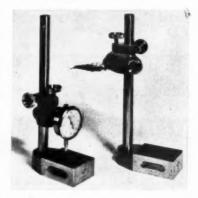
proof of durability. Easily installed. PRICED AT \$40. AND UP. FOR LATHES, SHAPERS, MILLERS, ETC. IMMEDIATE DELIVERY. Send for descriptive pamphlet.

W. L. STEEGE MACHINERY CO. 100 So. Jefferson St., Chicago, III.

Dickerman Height-Gauge

Features said by the maker not to have been heretofore available are claimed for this height-gauge and comparator, designed for efficient use of standard dial and "last word" indicators. Affording wide range for many jobs as height-gauge, comparator and for scriber-use, the instrument, it is pointed out, is easy to adjust and operate for old-timer as well as novice.

Simplicity of design makes it easy to transfer from job to job. Heavy base and a substantial, 10-inch column provide maximum rigidity for repeat readings.



Fine settings, easily made, are stressed by the manufacturer, H. E. Dickerman Mfg. Co., 321 Albany St. Springfield, Mass. Complete turn of adjustment screw, it is said, moves the indicator-holder less than .006 inch, without backlash, due to exclusive design of different lead threads in sliding member.

Generously - proportioned column and grooved anvil-base are hardened and ground, and the sliding member is precision-fitted.

Illustrations in the firm's literature show adaptations of the gauge as a comparator with standard dial indicator, height-gauging and scriber-use.



RUEMELIN MFG. CO., 3980 N. Palmer St., Milwaukee, Wis.

RUEMELIN FUME COLLECTOR

Storage

The problem of how best to store tools, parts, materials and stock is everpresent, for as soon as one has the problem solved in one direction, it becomes evident that it can be bettered in another. Further, about the time one believes that he has a good storage setup, he runs across some type of storage equipment which proves that it can put his storage on a better basis.

One thing which has been taking hold more and more in a good many plants is the idea of revolving storage elements.

A type of revolving storage for very small parts is an assembly made up of 24 small bins. The units are made in different sizes, but none of them is larger than 4 x 4 x 3 in for each bin. When made up, the 24 bins form a nearcubical assembly. mounted on a suitable base. They are fitted with a turnrod at the top center, permitting the assembly to be swung around until the front of the wanted bin desired faces the user. There are bins fronting on all four sides.

There are also large rotary bin units used by some, of regular stock-room or toolroom size, standing on the floor and reaching to a point above a man's head. They have rotary bins or trays, 5, 6 or 7-high, as the case may demand. Each of the rotary trays

is divided into a number of segments, to accommodate different materials, tools, or items of stock. Materials are made highly accessible in this way. There is no straining and reaching to the back of bins, for all parts are brought easily and quickly to hand, mechanically, where they can be clearly seen.

Buy U. S. War Savings Bonds and Stamps

PALMGREN ANGLE VISES



For Quick - Accurate Set-ups

PALMGREN Heavy Duty Angle Vises are built sturdy and rugged for tough, heavy jobs. They are accurately graduated in degrees, can be quickly adjusted to any angle, stay locked under severe service and save valuable hours otherwise wasted in tedious make-ready, wedging or making temporary jigs and fixtures.

Jaws are hardened and ground. Special outstanding features are the size and opening of jaws—4" Jaws open full 4"; the 6" Jaws open full 6" etc., with corresponding depth of Jaws. Vise can be used as ordinary vise when lowered to horizontal position. Swivel bases furnished if desired. Sizes 4", 6" and 8" Jaws and openings. Prompt deliveries.

With for Bulletin 0-3 "Not Angle Operations" and complete line of PALMEREN Vines CHICAGO TOOL & ENGINEERING CO.

MITS. OF PALMOREN PRODUCTS for over 25 years 8384 SOUTH CHICAGO AVENUE • • • CHICAGO

PRECISION WORK AT ANY ANGLE

Compression Springs

If you are winding springs in a lathe, it will pay you to use care when breaking into a new roll of wire. Tension in the roll should be released before beginning to use from it. To do this, tie some binding wire or cord, at intervals around the roll, among the original ties. Then cut the original ties. Then cut the original ties. This procedure will allow the roll of wire to expand, relieving tension without tangling or getting out of hand.

In some shops, preference is givwinding to springs with a hand tool. pendable units of this kind, that can be used in connection with any convenient vise, are readily obtained. Such tools wind a great variety of springs. Yet, there are operators who find it more convenient to order compression springs from firms specializing in their production. The springs are obtainable from a great many places. Even where compression springs made of oval or of square wire, for die components, there are ready sources of supply. They are usually firms which specialize in die makers' accessories.

Those using springs of compression type in large quantities, in products where proper functioning of contained

springs is important, should be fitted for testing the springs put into the product, whether those springs are made in their own plant, or whether they are purchased from an outside source. Spring testers will indicate whether springs are too weak or too strong, whether they are out of square, and whether there are hidden defects.

Spring testers may be had in either hand-operated or motor - driven type, depending on whether they are wanted for inspection or for production. GRINDALL EXTERNAL GRINDER - TOOL GRINDER - INTERNAL GRINDER 6'x12' THREAD GRINDER Model B



THREAD GRINDING MACHINES PORTABLE PRECISION GRINDERS BALL BEARING SPINDLES

General Machine Tool Co. SENECA FALLS

FOR REMOVING BROKEN TAPS

Quickly-

Insert WALTON Tap Extractor and back out broken piece. No annealing—no drilling.

Easily-

Tap Extractor and Tap Wrench are only tools needed.

Safely-

Threads are not damaged. Not necessary to tap oversize after broken tap is removed.

Folder 131 gives complete details.

OZ HOLLYM JAIL

95 ALLLYN STREET.

The Walton Co. 95 ALLYN STREET,



TANNEWITZ High Speed METAL CUTTING BAND SAWS

Fastest and best known means of cutting sheet steel, aluminum and magnesium sprues, gates, risers, and kindred items. Provides saw blade travel of over 2 miles per minute with perfect safety. Cuts are exceptionally smooth. Labor savings ranging from 25% to 90% are the usual thing.

For complete details simply write for bulletin on metal cutting band saws.

Built by Sawing Machinery Specialists

THE TANNEWITZ WORKS GRAND RAPIDS, MICHIGAN



CENTERLESS GRINDING

(Template Dressing) 300 ANGLE-SET

LOC-KEY-SET Rotate Nib to Sharpen

Only \$10.00 Extra. Requires only Common Quality Diamonds. BIG-HED Nibs to fit. \$12.00 per carat (3 to 4 carat size RE-SETABLE recommended.)

Enables bullet nose grinders to use common quality diamonds to dress form wheels by dressing from I* to 6" radius with the AN-GLE-SET. Eliminates wear to setting and use of thin diamonds.



Send specifications and prints for prices on turning and boring form tools.

DIAMOND TOOL COMPANY, Not Inc. 938 E. 41st Street

ARMSTRONG-BRA GEAR AND WHEEL PULLERS

- UNIVERSAL AND STANDARD TYPES



CHAINGRIP Universal pull Pullers spoked solid wheels. dears, pinions, bushings regardless of distance from end of shaft. (2 Proof tested sizes) chains have hooks for chain or close in grip. (2 sizes)

STEELGRIP Standard Rigid Arm Pullers have forged arms, adjustareach, improved designs. 2-arm, 3-arm and special designs. 11 types.

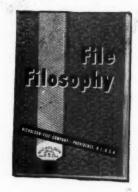
ARMSTRONG - BRAY Pullers save hours of time, prevent breakage. Keep wheels

ARMSTRONG-BRAY & CO. "The Belt Lacing People"

5364 Northwest Highway Chicago, U.S.A

File Filosophy

Stacked up with the amazing production machines we see everywhere, the lowly hand-file seems about as impressive as a bayonet compared with a "Block-Buster". But, just as the bayonet is an important weapon in the hand-to-hand fighting that brings final victory, after the "big guns" have done their softening - up; so is the hand-file often needed to give the final touch of quality and precision to a job of craftsmanship, after the machines have done their work.



Most of us know when we've got a good file. But how many ever give a thought to how it got that way?

That story was started back in the primitive days of man's history. For the file is one of the oldest tools known. It is recorded that as early as the days of King Saul (Samuel XIII; 21), about 1090 B.C., "they had a file for the mattocks, and for the soulters, and for the axes, and to sharpen the goads".

There are evidences of the stoneage files, made of sharp flint, dug up out of the cemetery of Hallstadt, in Upper Austria. Probably the first attempt to cut files by machine took place a few years before the discovery of America. But it took the development of such things as high-carbon steel, the annealing furnace and other modern refinements to make possible the efficient files of today.

FLEXIBLE ABRASIVE WHEELS



Designed for precision work where flexibility is required, these wheels are useful accessories for sanding and finishing regular and irregular jobs, penetrating into difficult recesses, lapping holes in dies, finishing various shapes of metal, wood, rubber and plastic parts.

Useful for finishing propellers in aircraft construction. Descriptive builtein and sample wheel will be sent on request. Prompt Deliveries.

FIELD ABRASIVE SPECIALTY MFG. CO.

203 LOWE BLDG., DAYTON, OHIO



Save tooling time. Build your fixtures around a completely pre-designed drill jig body.

Save production costs. Savings up to 60% in drilling time not uncommon. Lever locks work instantly—holds securely. Throw it back and work is released. No complicated adjustments. Save cost of expensive drill fixtures—just a bushing plate and adaptor needed for each job.

Order today. Please include contract number or priority certificate. Write for bulletin.

Mohr Lino-Saw Co.

130 N. Union Ave.

Chicago, III.

WATER removed from AIRLINES AUTOMATICALLY WITH THE MURPHY SEPARATOR



Sizes ½" to 4" Pipe

Literature and Prices on request,
RESULTS — — — GUARANTEED
NO ABSORBENTS — NO CHEMICALS

JAS. A. MURPHY & CO.



Red "E" DEMAGNETIZERS & ETCHERS FOR SPEED AND ECONOMY

A sturdy all around unit for any shop. Demagnetizes by throwing lower switch and passing work over magnetic poles at top of unit. Etching is controlled at upper switch with convenient six station selector to adjust depth of etch.

Red indicator light signals when unit is in operation, Rubber extension cord, plug, special alloy stching stylus with self cooling holder are included. Write for folder giving details.

GRINDING MACHINE CO. 2832 E. GRAND BLVD. DETROIT, MICH

A FIGHTING TOOL VITAL TO WAR WORK

To protect machinery from the hazards of dust and dirt, our armed services and war production plants rely on CADILLAC PORTABLE BLOWING TOOLS. Ask your mill supply dealer or write us.

All armed services and war production plants use Cadillacs.



Inquiries invited for universal type 1/50 to 1 HP motors.

CADILLAC

PORTABLE ELECTRIC COMBINATION

BLOWERS AND SUCTION CLEANERS

CLEMENTS MFG. CO. 6651 S. MARRAGANSETT AVE., CHICAGO, ILL.

Pioneer in the field was Wm. T. Nicholson, among others. He was founder of Nicholson File Co., 48 Acorn St., Providence, R. I., among the oldest and most prominent file makers. Back in 1878, Nicholson wrote a treatise on files, their proper selection and use. Today that volume, plus accumulated lore amassed during intervening years, has been published by the firm Nicholson founded. It contains information and facts that every file-user will value.

Written in clear, simple language, the booklet, "File Filosophy", is as understandable to the student as to the seasoned oldster or executive. Discussed are practically all angles of files, their history, development, qualities, uses and proper care. There are 48 illustrations.

Chapters deal with, terminology, mill files, files for machinists, rasps, Swiss pattern files, curved tooth files, drawfiling, lathe-filing, special-purpose files, for rough castings, die castings, stainless steel, aluminum, brass, lead, plastics, smooth finishing on soft metals, saw files, saw files, saw filing, precision filing, sharpening tools and implements.

Turret Lathe Bulletin

Bulletin 1002 describing South Bend Turret Lathes, Nos. 1001-Z and 1002-Z, has been recently issued.

This 4-page file size bulletin describes and illustrates these new Turret Lathes and their construction features. Convenient tabulated specifications list all the necessary information concerning capacities, feeds, speeds, and dimensions. These units are designed for the rapid production of small chucking and bar work to close tolerances. Both models have a 10-1/4" swing over the bed and saddle wings, 1-3/4" hole thru the headstock spindle, and 1" collet capacity. They are well adapted to second operation work.



Bulletin 1002 can be obtained from the South Bend Lathe Works, South Bend, Ind.

Buy United States War Savings Bonds and Stamps

I-G-C Relief Grinding Fixture

Industrial Grinding
Co., Los Angeles, Calif.,
announces a new I-GC Relief Grinding Fixture, a countersink
grinding device said to
speed up grinding operations materially.

"After a careful survey of the aircraft industry," says J. W. Boening, President, "Their needs were tabulated in order of their importance and these tabulations turned over to our engineering department. As a result the I-G-C Relief Grinder combines speed, accuracy and simplicity; for our survey had shown that the industry wanted a grinding fixture that would

turn out perfect work, quickly, without services of highly trained techni-

cians."

"With equal speed and accuracy," continues Boening, "The Grinder will handle countersinks of all types, center drills, integral pilot cutters and pilot-drills, etc.,—either right or left handed; and with only 2 wrenchs, the fixture can be adjusted quickly for correct relief and angle in relation to grinding wheel"

The Fixture fits any standard grinder, and will handle work from 1/16 to 1" in diameter with the standard collets available. Lift of the single cam is variable from .001 to ½" and ad-



justment pins are provided for 1, 2, 3, 4, 6 and 12 fluted cutter grinding.

The Grinder is extremely rugged for sustained accuracy. Main housing is of high grade cast iron, supporting a hardened and ground spindle on 2 large bearing surfaces that require only periodic oiling. Cam is hardened tool steel, with steel adjustment pins. Fixture swings 90 degrees right or left, and base is calibrated in 5 degrees increments.

The Grinder comes with one Hardinge type 5-C collet of ¼" capacity and 2 wrenches, ready for attachment to the grinder.

SPEED-UP YOUR PRODUCTION with

G-W-Special "C" Tool Bits G-W-Special "T" Tool Bits

GERITY-WAYNE TOOL COMPANY 6432 Cass Ave. Detroit, Mich.

"ALIVE" Ball Bearing Centers



"They turn with the work"
Write TODAY – and let us
tell you more about them.

MODERN MACHINE COMPANY 323 Berry St., Brooklyn, N. Y.

COMBINATION CENTER DRILLS Special Alloy and High Speed Steel

Regular Type



Ground with Radial Relief

Included angle 60 degrees. Other angles made special to order.

	DIMEN	ISIONS		PRICE PER DOZI	EN
	Dia.	Dia.	Length	H. S. Steel Net	H. S. Steel Not
A-1	Body 1/8"	3/64"	11/4"	\$2.50	\$7.20
C-2	13/64"	1/16"	17/8"	3.00	7.20
D-1	15/64"	5/64"	2"	3.25	7.20
E-1	3/10"	3/32"	21/8"	3.50	7.20
E-2	3/10"	1/8"	21/8"	3.50	7.20
F-1	7/16"	5/32"	23/4"	4.50	10.80
F-2	7/16"	3/16"	23/4"	4.50	10.80
J-1	1/2"	7/32"	3"	*****	16.20
J-2	1/2"	9/32"	3"	*****	16.20
M-1	5/8"	7/32"	31/4"	*****	21.60
M-2	5/8"	9/32"	31/4"	*****	21.60
N-1	3/4"	1/4"	31/2"	*****	28.80
N-2	3/4"	5/16"	31/2"	*****	28.80

PROMPT DELIVERY

Victor Machinery Exchange, Inc.

251 Centre Street

New York, N. Y.

HIGH SPEED SLITTING SAWS



THESE SAWS ARE HOLLOW GROUND

Dia. 2½	Width	Hole	Our Price Net Each High Speed
	1/32	⁷ /8	\$1.68
21/2	3/64	7/8	1.68
21/2	1/16	7/8	1.68
21/2	3/32	7/8	1.68
21/2	1/8	7/8	1.68
3	1/32	1	1.98
3	3/64	1	1.98
3 3 3	1/16	1	2.04
3	3/32	1	2.04
3	1/8	1	2.10
3	5/32	1	2.20
4	1/32	1	2.58
4	3/64	1	2.64
4	1/16	1	2.70
4	3/32	1	2.82
4	1/8	1	3.00
4	5/32	1	3.12
4	3/16	1	3.30
5	1/16	1	3.48
5	3/32	1	3.78
5 5 5	1/8	1-11/4	3.96
	5/32	1-11/4	4.20
5 5	3/16	1-11/4	4.44
6	1/16	1	4.38
6	3/32	î	5.02
6	1/8	1-11/4	5.16
6	3/16	1-11/4	6.24
8	1/16	1	10.00
Q.	1/8	1-11/4	10.50
8	3/16	1-11/4	11.88
U	3/10	1-174	22.00

PROMPT DELIVERY

Victor Machinery Exchange, Inc. New York, N. Y.

March 1943 MACHINE TOOL BLUE BOOK

Index To Advertisers

Abart Gear & Meh. Co. Aber Engineering Works Acme Diamond Tool Co.	160	C. W. C. Corp. Canedy-Otto Mfg. Co. Capewell Mfg. Co.	17
Aber Engineering Works	339	Canedy-Otto Mfg. Co.	6
Aeme Diamond Tool Co.	140	Capewell Mfg. Co.	. 13
		Carboloy Co., Inc. Carlyle-Johnson Machine Co.	15
Aeme Tool Co. Acromark Co. Aero Metal Stamping Co. Aget-Detroit Mfg. Co. Abhberg Rasting Co.	370	Carlyle-Johnson Machine Co.	. 33
Acromark Co.	246	Carpenter Steel Co. Center Scope Instrument Co.	. 35
Acro Metal Stamping Co.	129	Center Scope Instrument Co.	33
Aget-Detroit Mfg. Co. 227-246-286 Ahlberg Bearing Co. Aircraft Mehy. Corp.	-343	Center Tool Co. Cerro De Pasco Copper Corp.	23
Ahlberg Bearing Co. Aireraft Melay. Corp. Airway Pump & Equipment Co. Alco Tool Company Allen, Alva F.	959	Challenge Machinery Co.	. 0
Almon Pomp & Fordement Co.	202	Challenge Machinery Co. Chicago Die Casting Mfg. Company	99
Also Tool Company	43	Chicago Mfg. & Dist. Co.	18
Allen, Alva F.	294	Chicago Míg. & Dist. Co. Chicago Pneumatic Tool Co.	17
Allien, Alva F. Allien Tool & Engineering Co.	231	Chicago Rivet & Machine Co. Chicago Tool & Engineering Co. Chicago Wheel & Mig. Co. Clicago Wheel & Mig. Co. Cincinnati Electrical Tool Co.	9
Almond Mfg. Co., T. R.	284	Chicago Tool & Engineering Co.	37
Alofs Mfg. Co.	343	Chicago Wheel & Mfg. Co. 19	4-19
Alofa Mfg. Čo. Alphil Spot Welding Co.	228	Cincinnati Electrical Tool Co.	38
American Cutter & Engrg. Co. American Dismond Tool & Gage Co.	68	Cincinnati Grinders, Inc. Cincinnati Milling Machine Co.	
American Diamond Tool & Gage Co.	338	Cincinnati Milling Machine Co.	- 1
American Gage Co. American Measuring Instrument Corp.	191		
American Measuring Instrument Corp.	266	Cincinnati Shaper Co. Cincinnati Tool Co. 29	. 19
American Metal Works	339	Cincinnati Tool Co. 29	9-363
Ames Co., B. C. Ames Bag Co. Anderson Bros. Mig. Co.	125	Circular Tool Co.	. 6
Ames Bag Co.	296	Clark Co., Robt. H.	. 354
Anderson Bros. Mfg. Co.	335	Clements Mfg. Co.	371
Anderson & Brown Co. Armstrong - Blum Mig. Co. Inside Front Co.	200	Circular Tool Co. Clark Co., Robt. H. Clements Mg. Co. Cleveland Tool Eng. Co. Cleveland Twist Drill Co. Cleveland Wire Spring Co. Cluttom Machines. Inc.	53
Armstrong - Blum Mfg. Co. Inside Front Co	over	Cleveland Twist Drill Co.	. 69
Armstrong Bray & Co. Armstrong Bros. Tool Co. Aro Equipment Corp. Arter Grinding Mch. Co. Ash & Co.	376	Cleveland Wire Spring Co.	321
Armstrong Bros. Tool Co.	***	Clutsom Machines, Inc.	190
Are Equipment Corp.	346	Colborne Mfg. Co. Colwell, Co., S. G.	309
Arter Grinding Mcn. Co.	10	Comet Tools Inc	227
Ash & Co. Atlantic Mehry. Corp. Atlantic Saw Mfg. Co.	240		
Atlantic Ser Wife Co	905	Comtor Co. Cone Automatic Machine Co.	363
Atlas Equipment Co.	325	Continental Machines, Inc.	189
Atlas Press Co.	71	Conway Clutch Co	89
Atlas Press Co. Automatic Machine & Tool Co. Automotive Maintenance Machinery Co.	319	Conway Clutch Co. Coulter Machine Co., James	58
Automotive Maintenance Machinery Co.	42	Covel Manufacturing Co.	119
Auto Monlding & Mfg. Co.	216	Cratex Mfg. Co.	302
Auto Moulding & Mfg. Co	131	Cratex Mfg. Co. Criterion Machine Works	351
Avery Adhesives	245	Cullen-Friestedt Co.	268
Avey Drilling Machine Co.	52	Cuilman Wheel Co. Rack 6	Cores
		Cullen-Friestedt Co. Cullman Wheel Co. Back Cunningham Co., M. E.	365
		Cushman Chuek Co.	34
Bakewell Mfg. Co.	87	Danly Machine Specialties	343
Halder Electric Co.	288	Darnell Corp., Ltd.	150
Barber-Colman Co. Baumbach Mfg. Co., E. A. Bay State Abrasive Products Co. Behr-Manning Co.	85	Darnell Corp., Ltd. Dearborn, J. W. Delta Manufacturing Co. Desmond-Stephan Mfg. Co. Dessau Co., Maurice S. Detroit Power Screwdriver Co. Detroit True X. Tool. Co.	296
Baumbach Mfg. Co., E. A.	128	Delta Manufacturing Co.	205
Bay State Abrasive Products Co.	17	Desmond.Stephan Mfg. Co.	299
Behr-Manning Co.	156	Dessau Co., Maurice S.	164
		Detroit Power Screwdriver Co.	289
Serkeley Equipment Co.	49 57	Detroit Tap & Tool Co.	45
Senly Co., Chas. H.	57	Detroit Power Serewdriver Co. Detroit Tap & Tool Co. DeWitt Hotels Diamond Tool Co. Dix Mig. Co.	360
Severly Shear Co.	87	Diamond Tool Co.	376
Habe Co. Edward	28	Dix Mfg. Co. DoAll Company, Inc.	244
Handrad Marking Co	23	Down Company, Inc.	4-15
Mack Drill Go. Ilake Go., Edward Ilake Go., Edward Ilanchard Machine Co. Ilance Co., John 3 Ilanck & Huxton Machinery Co. 2	51	Dolge Co., C. B. Douglas Machinery Co. Front Cover-318 Dreia & Krump M.c. Co.	319
Hank & Buyton Machinery Co. 2	43	Dreis & Kenne Mrs. Co. Front Cover-318	342
loice-Crane Co.	84	Dreis & Krump Míg. Co. Drive-All Míg. Co.	106
loyar-Schultz Corp. 2	34	Drive-All Mfg. Co. Durant Mfg. Co. Duro Mch. Tools 300	150
leady-Penrod. Inc.	08	Duro Meh. Tools	301
leand Tool & Supply Co. 1	84	Dykem Co.	244
remil Mfg, Co. 2	28		
reper Electric Company 2	72	Eastern Engineering Co.	275
rewster-Squires Company 3	51	Eastern Engineering Co. Eastern Precision Gage Co.	216
ringeport macmines, me.	42	Eastern Tool Supply Co. East Shore Machine Products Co.	290
ridgeport Safety Emery Wheel Co. 2	71	East Shore Machine Products Co.	186
rown Corp., W. R.	40	Economy Machine Products Co. Egyptian Lacquer Mfg. Co.	351
rown Corp., W. R. rown Engineering Co. 256-3	41	Egyptian Lacquer Mfg. Co.	230
rown & Sharpe Mfg. Co. 3	20		
ryant Chucking Grinder Co. 1	49	Elgin Tool Works 3:	2-33
uffalo Forge Co. 1	97		
urke Machine Tool Co. 2	28	Erickson Steel Co.	240
rown & Sharpe Mfg. Co	78	Erickson Steel Co. Errington Mechanical Laboratory	281

VICTOR'S BARGAINS IN Tungsten Carbide Tipped Tools

Price \$1.00 Each In Any Size

New Low Prices. - Increase Production - Cut Operating Costs

Tools are tipped with Tungsten Carbide, and are suitable for machining cast-iron, brass, bronze, aluminum, non-ferrous materials (such as hard rubber, bakelite, fibre), and tough alloy steels up to 500 Brinell hardness.



Sizes not listed as well as special TIPPED TOOLS will be quoted upon request. When ordering, state tool number and quantity desired.

We Carry Silicon Carbide Emery Wheels for Grinding Tungsten Carbido Tool Bits

SEND FOR OUR CIRCULARS

Victor Machinery Exchange, Inc.

251 CENTRE STREET

NEW YORK, N. Y.

3

Evans Flexible Reamer Co.	142	Jarvis Co., Chas. L. Jefferson Mach. Tool Co.	13
Ex-Cell-O Corn.	25	Jefferson Mach. Tool Co.	201
Excelsior Tool & Machine Co.	305	Jessop Steel Co.	163
Experimental Tool & Die Company	344	Johnson Gas Appliance Co.	329
F & M Sales Company	174	Jessop Steel Co. Johnson Gas Appliance Co. Johnson Machine & Press Corp. Jones and Lamson Machine Co.	269
F. & M. Sales Company	325	Jones and Lamson Machine Co.	7-143
Famco Machine Co. Federal Foundry & Supply Co. Federal Press Co.	176	Karalam Inc. F	367
Federal Press Co.	362	Karelsen, Inc., E. Kearney & Trecker Corp.	37
Fell Co., Wm. B.	367	Kenlee Corn	224
Fell Co., Wm. B. Fellows Gear Shaper Co.	35	Kenlee Corp. Kirk & Blum Mfg. Co. Knight Machinery Co., W. B. Knu-Vise, Inc.	187
Fenn Mfg. Co.	283	Knight Machinery Co., W. H.	123
Fenn Mfg. Co. Field Abrasive Specialty Mfg. Co.	377	Knu-Vise, Inc. Koebel Diamond Tool Co.	217
Fisher Tool Co.	311	Koebel Diamond Tool Co.	217 357
Fisher Tool Co. Fitchburg Grinding Meh. Corp.	83	Krembs & Co.	330
Foley Mfg. Co.	236	The same of the sa	
Ford Manufacturing Co. M. A.	41	L-W Chuck Co.	193
Fray Machine Tool Co.	. 135	Lafavette Tool & Supply Co	100
Fulfio Specialties Co.	. 179	LaSalle Designing Co. L. & J. Press Corp. LeBlonde Machine Tool Co., R. K.	139
		L. & I. Press Corp.	371
Gairing Tool Co. Galland-Henning Mfg. Co.	347	LeBlonde Machine Tool Co., R. K.	115
Galland-Henning Mfg. Co. Gallmeyer & Livingston Co.	. 81	Lee Co., K. O.	309
Gallmeyer & Livingston Co.	391	Lee Co., K. O. Lempeo Prod. Inc.	151
Galter Manufacturing Co.	325	Leslie Welding Co. Lewis Machine Tool Co. Lewthwaite Machine Co., T. H.	176
Gardner Machine Co. General Iron & Seel Products Co.	. 80	Lewis Machine Tool Co.	128
General Iron & Seel Products Co.	327	Lewthwaite Machine Co., T. H.	178
Ceneral Machine Tool Co.	375		
General Tool & Die Co.	220	Liberty Planers, Inc. Liberty Tool & Gage Works	232
Genesee Tool Co. George Machinery Co., James W.	907	Liberty Tool & Gage Works	226
Coolin Warne Tool Co.	270		
Gerity-Wayne Tool Co. Gits Brothers Mfg. Co.	393	Lincoln Electric Co. Littell Machine Co., F. J.	117
Glenner Co. I. C	38	Littell Machine Co., F. J.	371
Glenser Co., J. C. Globe Products Mfg. Co.	140	Logan Engineering Co.	88
		Lovejoy Flexible Coupling Co.	359
Graham Mfe. Company	341	Lucas & Son, J. L.	20
Graham Rotary File & Tool Co.	93	Luma Electric Equipment Co.	363
Graham Mig. Company Graham Rotary File & Tool Co. Grant Mig. & Machine Co. Great Lakes Broach & Gage Co.	369	Littell Machine Co., F. J. Logan Engineering Co. Lovejoy Flexible Coupling Co. Lucas & Son, J. L. Luma Electric Equipment Co. Lyon-Raymond Corp.	348
Great Lakes Brosch & Gage Co.	99		
Green Mfg. Co.	317	M-B Products Co. McKenna Metals Co.	302
Green Mfg. Co. Greenerd Arbor Press Co.	281	McKenna Metals Co.	72
Greenfield Tap & Die Co.	76	Machine Products Corp. Machinery Mfg. Co. 73	46
Grenby Manufacturing Co.	70	Machinery Mfg. Co73	-116
Grinding Machine Co.	377	Madison-Kipp Corp.	271
Grob Brothers Grobet File Co. of Am. 302	367	Madison-Kipp Corp. Mahr Mfg. Co. Majestic Tool & Mfg. Co.	54
Grobet File Co. of Am. 302	-303	Majestic Tool & Mig. Co.	321
		Mall Tool Company	241
Hamilton Tool Co., The 303 Hammond Machinery Builders	-306	Maplewood Machinery Co.	
Hammond Machinery Builders	358	Marshalltown Mfg. Co. Master Tool Co. Mead Specialties Co. Meyers Company, W. F. Midwest Abrasive Co. Midwest Tool & Eng. Co.	311
Hanifen J. L.	372	Mand Specialties Co.	152
Hanniûn Mfg. Co.	113	Meyers Company, W. F.	74
Hansen Manufacturing Co.	185	Midwest Abrasive Co.	59
Hardinge Brothers, Inc.	337	Midwest Tool & Eng. Co.	371
Hart Machine Co.	182	Midwest Tool & Mfg. Co.	22
Harvey Mfs. Corn	291	Mill River Tool Co.	26
Hart Machine Co. Hartford Special Machinery Co. Harvey Mfg. Corp. Haskins Company, R. G. Hassall, Inc., John	47	Millers Falls Co. Modern Machine Co.	24
Hassall Inc. John	349	Modern Machine Co.	379
Heimann Mfg. Co.	292		
Heller Bros.	153	Mohr Lino-Saw Co.	377
Heller Bros. Herkimer Tool & Model Works	242	Morey Machinery Co., Inc. 172-269-	369
Hevi-Duty Electric Co.	82	Mohr Lino-Saw Co. Morey Machinery Co., Inc. 172-269- Mores Tool Co. Motor Tool Mfg. Co. Murchey Mch. and Tool Co. Murphy & Co., James A.	278
Hilliard Corp. Hobart Brothers Co.	152	Motor Tool Mfg. Co.	387
Hobart Brothers Co.	1	Murchey Mch. and Tool Co.	31
Hotel Fort Meigs	300	Murphy & Co., James A.	377
Hotel Lafayette	371		
moter metropote	357	National Acme Co.	132
Hotel Ohio	365	National Acme Co. National Air Sanders, Inc.	310
Howe & Son, Inc.	300	National Machine Tool Co.	173
Hy-Pro Tool Co.	248	Nedeo Co.	355
		Needham Co., E. H.	324
Ideal Commutator Dresser Co	298	New Britain Tool & Mfg Co.	363
Illinois Testing Laboratories, Inc.	172		216
Industrial Diamond Co.	165	New Plastic Corp. Nichols & Sons, W. H. Nicholson & Co., W. H.	192
Industrial Products Suppliers	174	Nichols & Sons, W. H.	00
A S. Tool Co.	170	Nicholson & Co., W. H.	291
J. & S. Tool Co.	170 301		111
Jack Tool Co. Jackson Machine & Tool Co.	356	Nielsen Lugineering Co., John	176
PRETADOR MECHINE & LOOK CO.	300	Nielsen, Inc.	375

Porter-McLeod-Screw Cutting Engine Lathe



16 Inch-12 Speed-Geared Head-Quick Change

Swing over bed17"
Swing over bed
Dist. bet. centers (6' bed tailstock flush)36"
Dist. bet. centers (tailstock overhung). 40"
Tailstock spindle travels51/4"
Tailstock spindle diameter21/4"
Taper of Centers
Front spindle bearingTimken
Rear spindle bearingTimken
Hole through spindle 5/16"
Diameter threaded nose 3/16"
Number of threads on same 7 per inch
Number of threads and feed changes 40
Stand. lathe will cut following threads
per inch: 2, 21/4, 21/2, 23/4, 2%, 3, 31/4, 31/2,
4, 41/2, 5, 51/2, 53/4, 6, 61/2, 7, 8, 9, 10,
11, 111/2, 12, 13, 14, 16, 18, 20, 22, 23, 24,
26. 28, 32, 36, 40, 44, 46, 48, 52 and 56.

Steady rest opening......41/ Driving pulley diameter9" Revolutions per minute410 Weight on skids (6' bed)3400 lbs.
Weight crated (6' bed)3700 lbs.
Wt. boxed for Ocean shipments. 4200 lbs. Export boxes (6' bed)..102" x 381/2" x 62" Weight per extra foot of bed.....150 lbs. Largest diameter held in split chuck..%" Lathes furnished with 5, 6, 7, 8 and 10 foot beds.

Engine Lathes

Cold Sawing Machines Abrasive Cut Off Machines

PORTER - McLEOD MACHINE TOOL CO., INC. HATFIELD, MASSACHUSETTS

	315	Standard Mashinger Co	247
Nilson Machine Co., A. H.	120	Standard Transmission Four	160
Nobur Mg. Co. Nogren Co., C. A. Norton Co. Numberall Stamp & Tool Co.	366	Standard Machinery Co. Standard Transmission Equip. Co. Star Machine & Engineering Corp.	186
Norton Co. 15	4.155	Steere Machinery Co. W. 1	372
Numberall Stemp & Tool Co.	184	Steepe Machinery Co., W. L. Stokerunit Corp. Stone Co., Herman	51
		Stone Co. Horman	314
Ollers Instrument Co.		Stow Mfg. Co.	218
Oliver Instrument Co.	357	Stow Mfg. Co. Sturdimatic Tool Co. Sturievant Co., P. A.	267
Oliver Motorcraft Corp. O'Neil-Irwin Manufacturing Co.	305	Sturtevant Co., P. A.	219
O'Neil-trwin Manufacturing Co.	303	Sun Oil Co.	237
		Sun Oil Co. Sundstrand Machine Tool Co.	10
Paddock Tool Co.	341	Sunnen Products Co.	36
Pai Tool Co. Peerless Machine Co.	297	Super Tool Co.	30
Peerless Machine Co.	215	Sutton Tool Co.	61
Phillips Mfg. Co.	316		
Phillips Mfg. Co. Pier Equipment Mfg. Co. Plunket Machine Co., J. B.	332	T. & H. Mfg. Co. 174 Tannewitz Works	-176
Plunket Machine Co., J. E.	308	Tannewitz Works	375
Porter-Cable Machine Co. Porter-McLeod Machine Tool Co.	263	Tatra Tool Co. Taylor Machine Co.	128
Porter-McLeod Machine Tool Co.	387	Taylor Machine Co.	303
Pratt & Whitney Precise Products Corp. Prints Electric Co. Procunier Safety Chuck Co.	383	Thomas Hoist Co. Threadwell Tap & Die Co.	343
Precise Products Corp.	336	Threadwell Tap & Die Co.	322
Prints Electric Co.	305	Tomkins-Johnson Co. Topeka Foundry & Iron Works	79
Production Instrument Co.	210	Topeka Foundry & Iron Works	315
		Torit Mfg. Co.	180
Production Machine Co.	285	Travers Tool Co.	353
Producto Machine Co. Progressive Tool & Cutter Co.	204	Trico Fuse Mfg. Co.	176
Progressive 1001 & Cutter Co.	177	Torit Mg. Co. Travers Tool Co. Trico Fase Mg. Co. Trindl Products, Ltd. Torr Electric Mg. Co.	264
Putnam Tool Co. Pyrometer Instrument Co.	170	Torq Electric Mfg. Co. Triplex Machine Tool Corp.	239
ryrometer instrument Co.	110	Triplex Machine Tool Corp.	256
			42
Quality Tool & Die Co. 277	-337	Trovke, Alfred A.	303
		Tru-Cut Tool Co. Turchan Follower Machine Co.	270
R & L Tools	62	Turchan Follower Machine Co.	207
R & L Tools Reading Machine Co., Recor M(g. Co.	246		
Recor Mfg. Co.	273	United Precision Products Co.	361
Reeves Pulley Co. Remeo Products Corp. Republic Tool Mfg. Co.	98		
Remeo Products Corp.	282	U. S. Tool Co.	16
Republic Tool Mrg. Co.	273	Universal Engineering Co. 116-	-144
Reynolds Mehy. Co.	294	U. S. Tool Co. Universal Engineering Co. 116- Upton Electric Furnace Div. 166-	-167
Reynolds Mehy. Co. Richards Co., J. A. Rivett Lathe & Grinder, Inc.	228		
Rivett Lathe & Grinder, Inc.	-2	Vacuum Cup Metal Pulley Co.	361
Robbins Engrg. Co. Robertson & Co., F. H. Rogers & Co., Samuel C.	56	Van Keuren Co.	235
Robertson & Co., F. H.	287	Victor Machinery Exchange 380-381	383
Rogers & Co., Samuel C.	312	Victor Saw Works	238
Pagers Total Comp. Pales W.	211	Vimeo Manufacturing Co.	359
Rogers Tool Corp., John M.	138	Vacuum Cup Metal Pulley Co. Van Keuren Co. Victor Machinery Exchange 380-381- Victor Saw Works. Vimeo Manufacturing Co. Vince Corp.	359 118
Rogers Tool Corp., John M. Ross Co., David J. Ross Co., David J.	211 138 327	Vimco Manufacturing Co	359 118 301
Rogers McGr, Samuel Co. Rogers Machine Works Rogers Tool Corp., John M. Ross Co., David J. Ross Operating Valve Co.	138 327 137	Vonnegut Moulder Corp.	301
	138 327 137 367	Vonnegut Moulder Corp.	301
	138 327 137 367	Vonnegut Moulder Corp.	301
Rotor Tool Co. Rouse & Co., H.R.	138 327 137 367 141	Vonnegut Moulder Corp.	301
Rotor Tool Co. Rouse & Co., H.R.	138 327 137 367 141	Vonnegut Moulder Corp.	301
Rotor Tool Co. Rouse & Co., H.R.	138 327 137 367 141	Vonnegut Moulder Corp.	301
	138 327 137 367 141	Vonnegut Moulder Corp.	301
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mg. Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T.	138 327 137 367 141 331 373 184 104	Vonnegut Moulder Corp.	301
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T.	138 327 137 367 141 331 373 184 104	Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walloc Supplies Mfg. Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co.	301 142 355 198 368 369 375 12
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T.	138 327 137 367 141 331 373 184 104	Wade Instrument Co. Wade Tool Company. Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Wardwell Mfg. Co.	301 142 355 198 368 369 375 12 317
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. S & S Machine Works Sav.Way Industrice Scientific Lubricants Co. Schattian Lathe Co.	138 327 137 367 141 331 373 184 104	Wade Instrument Co. Wade Tool Company. Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Wardwell Mfg. Co.	301 142 355 198 368 369 375 12 317
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. S & S Machine Works Sav.Way Industrice Scientific Lubricants Co. Schattian Lathe Co.	138 327 137 367 141 331 373 184 104 282 97 244 6	Wade Instrument Co. Wade Tool Company. Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallec Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Warren Industries	142 355 198 368 369 375 12 317 145 262 265
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. S & S Machine Works Sav-Way Industries Scientific Lubricants Co. Schauer Machine Co. Schauer Machine Co.	138 327 137 367 141 331 373 184 104 282 97 244 6	Vonnegat Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Warren Industries Wendt-Sonis Co.	301 142 355 198 368 369 375 12 317 145 262 265 329
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. S & S Machine Works Sav-Way Industries Scientific Lubricants Co. Schauer Machine Co. Schauer Machine Co.	138 327 137 367 141 331 373 184 104 282 97 244 6	Vonnegat Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Warren Industries Wendt-Sonis Co.	301 142 355 198 368 369 375 12 317 145 262 265 329
Rotor Tool Co. Rouse & Co., H.B. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. & & Machine Works Sav. Way Industries Scientific Lubricants Co. Schastian Lathe Co. Schautian Lathe Co. Schauter Machine Co. Scher Co., George Schmitt, Inc., George T. Schults & Anderson Co.	138 327 137 367 141 331 373 184 104 282 97 244 6 284 259 307	Vonnegat Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Warren Industries Wendt-Sonis Co.	301 142 355 198 368 369 375 12 317 145 262 265 329
Rotor Tool Co. Rouse & Co., H.B. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. & & Machine Works Sav. Way Industries Scientific Lubricants Co. Schastian Lathe Co. Schautian Lathe Co. Schauter Machine Co. Scher Co., George Schmitt, Inc., George T. Schults & Anderson Co.	138 327 137 367 141 331 373 184 104 282 97 244 6 284 259 307	Vonnegat Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Warren Industries Wendt-Sonis Co.	301 142 355 198 368 369 375 12 317 145 262 265 329
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. S & S Machine Works Sar-Way Industries Scientific Lubricants Co. Schastlan Lathe Co. Schastlan Lathe Co. Schare Co., George Schmidt, Iuc., George T. Schuits & Anderson Co. Sellers & Co., William Senera Falls Machine Co.	138 327 137 367 141 331 373 184 104 282 97 244 6 284 259 307	Wade Instrument Co. Wade Tool Company. Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walloo Co. Wallec Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Warren Industries Wendt-Sonis Co. Warde Mfg. Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Western Hondustries Western Manufacturing Co. Wigglesworth Machine Co. Wigglesworth Machine Co.	301 142 355 198 369 375 12 317 145 262 263 329 147 174 75 161
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. \$\frac{2}{3}\$ S Machine Works Sav-Way Industries Scientific Lubricants Co. Schauter Machine Co. Schauter Machine Co. Schauter Co., George Schmidt, Inc., George T. Schults & Anderson Co. Sellers & Co., William Seneca Falls Machine Co. Sewerance Tool Co.	138 327 137 367 361 331 373 184 104 282 97 244 6 284 259 307 313 249 39	Wade Instrument Co. Wade Tool Company. Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walloo Co. Wallec Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Warren Industries Wendt-Sonis Co. Warde Mfg. Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Western Hondustries Western Manufacturing Co. Wigglesworth Machine Co. Wigglesworth Machine Co.	301 142 355 198 369 375 12 317 145 262 263 329 147 174 75 161
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. \$\frac{2}{3}\$ S Machine Works Sav-Way Industries Scientific Lubricants Co. Schauter Machine Co. Schauter Machine Co. Schauter Co., George Schmidt, Inc., George T. Schults & Anderson Co. Sellers & Co., William Seneca Falls Machine Co. Sewerance Tool Co.	138 327 137 367 361 331 373 184 104 282 97 244 6 284 259 307 313 249 39	Wade Instrument Co. Wade Tool Company. Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walloo Co. Wallec Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Warren Industries Wendt-Sonis Co. Warde Mfg. Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Western Hondustries Western Manufacturing Co. Wigglesworth Machine Co. Wigglesworth Machine Co.	301 142 355 198 369 375 12 317 145 262 263 329 147 174 75 161
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ruthman Machinery Co. Sav Way Industries Seientific Lubricants Co. Schauer Machine Co. Schemidt, Ine., George T. Schults & Anderson Co. Sellers & Co., William Seneca Falls Machine Co. Sheffield Corp. Sheldon Machine Co. Sheldon Machine Co.	138 327 137 141 331 184 104 282 97 244 6 284 259 313 249 127 251	Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walloo Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Wardwell Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Warren Industries Inc. Weldex, Inc. Warren Industries Tool & Mfg. Co. Westhe Electric Co., B. A. Western Tool & Mfg. Co. Western Manufactur ng Co. Wigglesworth Machine Co. White Dental Mfg. Co., S. S. Whitney Metal Tool Co. Wilberton Co., Thomas	301 142 355 198 368 369 375 12 317 145 262 265 329 147 175 161 209 317 223
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ruthman Machinery Co. Sav Way Industries Seientific Lubricants Co. Schauer Machine Co. Schemidt, Ine., George T. Schults & Anderson Co. Sellers & Co., William Seneca Falls Machine Co. Sheffield Corp. Sheldon Machine Co. Sheldon Machine Co.	138 327 137 141 331 184 104 282 97 244 6 284 259 313 249 127 251	Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walloo Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Wardwell Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Warren Industries Inc. Weldex, Inc. Warren Industries Tool & Mfg. Co. Westhe Electric Co., B. A. Western Tool & Mfg. Co. Western Manufactur ng Co. Wigglesworth Machine Co. White Dental Mfg. Co., S. S. Whitney Metal Tool Co. Wilberton Co., Thomas	301 142 355 198 368 369 375 12 317 145 262 265 329 147 175 161 209 317 223
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ruthman Machinery Co. Sav Way Industries Seientific Lubricants Co. Schauer Machine Co. Schemidt, Ine., George T. Schults & Anderson Co. Sellers & Co., William Seneca Falls Machine Co. Sheffield Corp. Sheldon Machine Co. Sheldon Machine Co.	138 327 137 141 331 184 104 282 97 244 6 284 259 313 249 127 251	Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walloo Co. Wardwell Mig. Co. Wardwell Mig. Co. Wardwell Mig. Co. Wardwell Mig. Co. Welch Industries Inc. Welch Industries Inc. Weldex, Inc. Weldex, Inc. Weren Industries Werder-Sonis Co. Wesche Electric Co., B. A. Western Tool & Mig. Co. Western Manufactur ng Co. Wigglesworth Machine Co. White Dental Mig. Co., S. S. Whitney Metal Tool Co. Wilbon, K. R. Wilson Mechanical Instrument Co.	301 142 355 198 368 369 375 12 317 145 262 265 329 147 175 161 209 317 223
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ruthman Machinery Co. Sav Way Industries Seientific Lubricants Co. Schauer Machine Co. Schemidt, Ine., George T. Schults & Anderson Co. Sellers & Co., William Seneca Falls Machine Co. Sheffield Corp. Sheldon Machine Co. Sheldon Machine Co.	138 327 137 141 331 184 104 282 97 244 6 284 259 313 249 127 251	Vonnegut Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Weldex, Inc. Weren Industries Wendt-Sonis Co. Warren Industries Wendt-Sonis Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Western Tool & Mfg. Co. Wigglesworth Machine Co. Wigglesworth Machine Co. Willier Manufactur in Co. Willier Co., S. S. Whitney Metal Tool Co. Willerin Co., Thomas Willey's Carbide Tool Co. Wilson M. R. Wilson Mechanical Instrument Co. Winter Brothers	301 142 198 368 369 375 12 317 145 2265 329 147 174 75 161 209 317 317 317 325 325 329 325 335 335 355 329 325 325 325 325 325 325 325 325 325 325
Rotor Tool Co. Rouse & Co., H.B. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. \$\frac{2}{3}\$ S Machine Works Sav-Way Industries Scientific Lubricants Co. Schanter Machine Co. Schauer Machine Co. Schauer Co., George Schmidt, Inc., George T. Schults & Anderson Co. Scheins & Co., William Sancea Falls Machine Co. Sheffich Corp. Sheldon Machine Co. Signode Sicel Strapping Co. Signode Sicel Strapping Co. Sigmones Machine Tool Corp.	138 327 137 141 331 373 184 104 282 97 244 6 284 307 313 39 127 251 255 336 90	Vonnegat Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Weldex, Inc. Weldex, Inc. Weren Industries Wendt-Sonis Co. Warren Industries Wendt-Sonis Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Western Manufactur ng Co. Wigglesworth Machine Co. White Dental Mfg. Co., S. S. Whitney Metal Tool Co. Wilberton Co., Thomas Willey's Carbide Tool Co. Willoy & Carbide Tool Co. Wilson, K. R. Wilson Mechanical Instrument Co. Winter Brothers Wirth & Son, Carl	301 142 355 198 368 369 375 12 317 145 2265 329 1174 75 1209 317 223 395 222 255 55
Rotor Tool Co. Rouse & Co., H.B. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. \$\frac{2}{3}\$ S Machine Works Sav-Way Industries Scientific Lubricants Co. Schanter Machine Co. Schauer Machine Co. Schauer Co., George Schmidt, Inc., George T. Schults & Anderson Co. Scheins & Co., William Sancea Falls Machine Co. Sheffich Corp. Sheldon Machine Co. Signode Sicel Strapping Co. Signode Sicel Strapping Co. Sigmones Machine Tool Corp.	138 327 137 141 331 373 184 104 282 97 244 6 284 307 313 39 127 251 255 336 90	Vonnegat Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Weldex, Inc. Weldex, Inc. Weren Industries Wendt-Sonis Co. Warren Industries Wendt-Sonis Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Western Manufactur ng Co. Wigglesworth Machine Co. White Dental Mfg. Co., S. S. Whitney Metal Tool Co. Wilberton Co., Thomas Willey's Carbide Tool Co. Willoy & Carbide Tool Co. Wilson, K. R. Wilson Mechanical Instrument Co. Winter Brothers Wirth & Son, Carl	301 142 355 198 368 369 375 12 317 145 2265 329 1174 75 1209 317 223 395 222 255 55
Rotor Tool Co. Rouse & Co., H.B. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. \$\frac{2}{3}\$ S Machine Works Sav-Way Industries Scientific Lubricants Co. Schanter Machine Co. Schauer Machine Co. Schauer Co., George Schmidt, Inc., George T. Schults & Anderson Co. Scheins & Co., William Sancea Falls Machine Co. Sheffich Corp. Sheldon Machine Co. Signode Sicel Strapping Co. Signode Sicel Strapping Co. Sigmones Machine Tool Corp.	138 327 137 141 331 373 184 104 282 97 244 6 284 307 313 39 127 251 255 336 90	Vonnegat Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Weldex, Inc. Weldex, Inc. Weren Industries Wendt-Sonis Co. Warren Industries Wendt-Sonis Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Western Manufactur ng Co. Wigglesworth Machine Co. White Dental Mfg. Co., S. S. Whitney Metal Tool Co. Wilberton Co., Thomas Willey's Carbide Tool Co. Willoy & Carbide Tool Co. Wilson, K. R. Wilson Mechanical Instrument Co. Winter Brothers Wirth & Son, Carl	301 142 355 198 368 369 375 12 317 145 2265 329 1174 75 1209 317 223 395 222 255 55
Rotor Tool Co. Rouse & Co., H.B. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. \$ & S Machine Works Sav.Way Industries Scientific Lubricants Co. Schauter Machine Co. Schauter Machine Co. Schauter Machine Co. Schauter Co., George Schmidt, Inc., George T. Schults & Anderson Co. Sellers & Co., William Seneca Falls Machine Co. Saverance Tool Co. Saverance Tool Co. Spefield Corp. Shelidon Machine Co. Signode Steel Strapping Co. Signode Steel Strapping Co. Simmons Machine Tool Corp. Skilsaw, Inc. Smith Co., Anton Smith Power Transmission Co. Smith Fook Annon Smith Power Transmission Co.	138 1327 1367 141 137 1367 141 137 137 131 184 282 244 284 225 244 259 127 255 333 249 255 333 249 255 333 255 266 276 276 276 276 276 276 276 276 276	Vonnegut Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Weldex, Inc. Weren Industries Wendt-Sonis Co. Warren Industries Wendt-Sonis Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Western Tool & Mfg. Co. Wigglesworth Machine Co. Wigglesworth Machine Co. Wiglesworth Machine Co. Willer Co	142 355 198 368 368 375 12 367 145 262 265 265 147 77 161 209 335 922 223 335 922 55 292
Rotor Tool Co. Rouse & Co., H.B. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. \$ & S Machine Works Sav.Way Industries Scientific Lubricants Co. Schauter Machine Co. Schauter Machine Co. Schauter Machine Co. Schauter Co., George Schmidt, Inc., George T. Schults & Anderson Co. Sellers & Co., William Seneca Falls Machine Co. Saverance Tool Co. Saverance Tool Co. Spefield Corp. Shelidon Machine Co. Signode Steel Strapping Co. Signode Steel Strapping Co. Simmons Machine Tool Corp. Skilsaw, Inc. Smith Co., Anton Smith Power Transmission Co. Smith Fook Annon Smith Power Transmission Co.	138 1327 1367 141 137 1367 141 137 137 131 184 282 244 284 225 244 259 127 255 333 249 255 333 249 255 333 255 266 276 276 276 276 276 276 276 276 276	Vonnegut Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Weldex, Inc. Weren Industries Wendt-Sonis Co. Warren Industries Wendt-Sonis Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Western Tool & Mfg. Co. Wigglesworth Machine Co. Wigglesworth Machine Co. Wiglesworth Machine Co. Willer Co	142 355 198 368 368 375 12 367 145 262 265 265 147 77 161 209 335 922 223 335 922 55 292
Rotor Tool Co. Rouse & Co., H.B. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. \$\frac{\pi}{2}\$ & S Machine Works Sav.Way Industries Scientific Lubricants Co. Schauer Machine Co. Schauer Go., George Schmidt, Inc., George T. Schults & Anderson Co. Sellers & Co., William Seneca Falls Machine Co. Saverance Tool Co. Sheffield Corp. Sheldon Machine Co. Signode Steel Strapping Co. Signode Steel Strapping Co. Simmons Machine Tool Corp. Skilasw, Inc. Smit & Co., Anton Smith Tool & Eng. Co. Smith Tool & Eng. Co. Sommer & Adams Co. Sommer & Adams Co.	138 1327 137 137 131 131 131 131 131 131 131 13	Vonnegut Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Wallon Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Weldex, Inc. Weren Industries Wendt-Sonis Co. Warren Industries Wendt-Sonis Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Wester Tool & Mfg. Co. Wigglesworth Machine Co. Wigglesworth Machine Co. Willier Mfg. Co. Wyzenbeck & Staff, Inc. Yoomans Tool Co. Yobe Sunny Co. Wm. S.	1142 355 198 368 369 375 12 262 265 329 147 175 161 223 335 95 222 94 257
Rotor Tool Co. Rouse & Co., H.B. Rouse & Co., H.B. Ruemelin Mfg. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. \$ & S Machine Works Saw-Way Industries Scientific Lubricants Co. Schatter Machine Co. Schatter Machine Co. Schatter Machine Co. Schatter Co., George Schmidt, Inc., George T. Schults & Anderson Co. Scheit Co., William Seneca Falls Machine Co. Shefield Corp. Sheldon Machine Co. Sid Tool Co. Signode Steel Strapping Co. Simmons Machine Tool Corp. Skilsaw, Inc. Smith Fower Transmission Co. Smith Tool & Eng. Co. Smith Tool & Eng. Co. Smith Tool & Eng. Co. Sommer & Adams Co. Sommer Tool & Machine Works & South Read Lath Works	138 1327 137 137 137 131 137 131 131 137 131 131	Vonnegut Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Wallon Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Weldex, Inc. Weren Industries Wendt-Sonis Co. Warren Industries Wendt-Sonis Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Wester Tool & Mfg. Co. Wigglesworth Machine Co. Wigglesworth Machine Co. Willier Mfg. Co. Wyzenbeck & Staff, Inc. Yoomans Tool Co. Yobe Sunny Co. Wm. S.	1142 355 198 368 369 375 12 262 265 329 147 175 161 223 335 95 222 94 257
Rotor Tool Co. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ruthman Machinery Co. Ruthman Machinery Co. Sav Way Industries Seientific Lubricants Co. Schaster Machine Co. Schauer Machine Co. Schauer Machine Co. Schauer Co., George Schmidt, Ine., George T. Schults & Anderson Co. Schers & Co., William Sancea Falls Machine Co. Severance Tool Co. Shefield Corp. Sheldon Machine Co. Signode Steel Strapping Co. Slimmons Machine Co. Signode Steel Strapping Co. Slimmons Machine Tool Corp. Skilsaw, Ine. Smit & Co., Anton Smith Tool & Co. Smith Tool & Eng. Co. Smith Tool & Eng. Co. Sommer & Adams Co. Sommer & Adams Co. Sommer & Adams Co. Southwest Mig. Co. Southwest Mig. Co.	138 1327 1367 1313 137 1313 1313 1313 1313 1313	Vonnegut Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonoy Corp. Walls Sales Corporation Wallon Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Weeke Industries Inc. Weldex, Inc. Weldex, Inc. Weren Industries Wendt-Sonis Co. Warren Industries Wendt-Sonis Co. Wesche Electric Co., B. A. Western Tool & Mfg. Co. Western Tool & Mfg. Co. Wigglesworth Machine Co. Wigglesworth Machine Co. Willier Co. Wysenbeck & Staff, Inc. Yeomans Tool Co. Yohe Supply Co., Wm. S. Yots Mfg. Co. Vons Mfg. Co.	1142 355 198 368 369 375 12 262 265 329 147 175 161 223 335 95 222 94 257
Rotor Tool Co. Rouse & Co., H.B. Rouse & Co., H.B. Ruemelin Mig. Co. Ruthman Machinery Co. Ruthman Machinery Co. Ryerson & Son, Inc., Jos. T. \$\frac{\pi}{2}\$ & S Machine Works Sav.Way Industries Scientific Lubricants Co. Schauer Machine Co. Schauer Go., George Schmidt, Inc., George T. Schults & Anderson Co. Sellers & Co., William Seneca Falls Machine Co. Saverance Tool Co. Sheffield Corp. Sheldon Machine Co. Signode Steel Strapping Co. Signode Steel Strapping Co. Simmons Machine Tool Corp. Skilasw, Inc. Smit & Co., Anton Smith Tool & Eng. Co. Smith Tool & Eng. Co. Sommer & Adams Co. Sommer & Adams Co.	138 1327 1367 1313 137 1313 1313 1313 1313 1313	Vonnegut Moulder Corp. Wade Instrument Co. Wade Tool Company Walker-Turner Co Wall-Colmonory Corp. Walls Sales Corporation Walton Co. Wallace Supplies Mfg. Co. Wardwell Mfg. Co. Welch Industries Inc. Weldex, Inc. Weldex, Inc. Weldex, Inc. Western Industries Wendt-Sonis Co. Waster Electric Co., B. A. Western Tool & Mfg. Co. Western Tool & Mfg. Co. Wigglesworth Machine Co. Wigglesworth Machine Co. Wigglesworth Co., S. S. Whitney Metal Tool Co. Wilter Machine Tool Co. Wilter Machine Tool Co. Wilter Machine Tool Co. Wilter Mr. R. Wilson Mechanical Instrument Co. Winter Brothers Wirth & Son, Carl Wittek Mfg. Co. Wysenbeck & Staff, Inc. Yeomans Tool Co. Yost Mfg. Co.	1142 355 198 368 369 375 12 262 265 329 147 175 161 223 335 95 222 94 257





A POWERFUL SUCTION IS IMPORTANT

There is no chance for grinder dust to damage human lungs and work as an abrasive on expensive equipment when it is trapped the instant it leaves the wheel.

The powerful fan of the Air Master surely and quietly draws harmful grit of grinding and buffing wheels into filter bags - - keeps it out of the air. There's a size for every wheel. Easy to install, easy to clean.

Write today for descriptive literature.



ELECTRIC DRILLS • GRINDERS • BUFFERS • PORTABLE TOOLS

The Cincinnati Electrical Tool Co.

3702-3 MADISON RD.

ENDISPENSABLE for WAR PRODUCTION

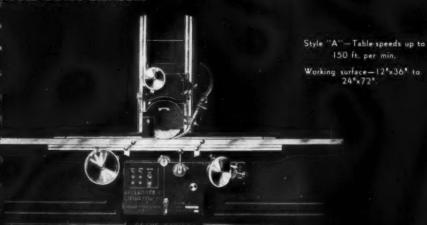
No. 55-Table speeds up to 125 ft. per min.

Working Surface - 12"x36".

rhese Grand Rapids Grinders, and others, will enable you o meet the demands of the present Defense program.

They offer you new standards of grinding performance new production economies and new facilities for improving your products.

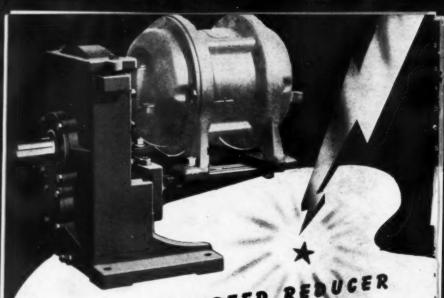
get us send you complete details on these and other GRAND RAPIDS GRINDERS



GALLMEYER & LIVINGSTON CO.

405 STRAIGHT AVE., S. W.

GRAND RAPIDS, MICH.



CULLMAN SPEED REDUCER

The high speed of electric motors can be stepped down economically with Cullman Speed Reducers to meet the requirements of the slower machine operations. They are made in single, double or quadruple reduction types for motors from 1/4 to 15 H.P. Ratio 1.65 to 1 to 1015 to 1. Cullman Speed Reducers are compact, dura-

ble and efficient. They are equipped with Roller Bearings, Helical Gears, Sprockets, and Roller Chains, all operating in oil. Motor mounting is easy, and when completed makes a single unit that simplifies installation on machines.

Write for complete information.

CULLMAN WHEEL COMPANY

50 WEST ALTGELD STREET, CHICAGO, ILLINOIS

